SECOND SERIES,

No. 22.

BULLETIN

OF THE

STATE EXPERIMENT STATION,

BATON ROUGE, LA.

WM. C. STUBBS, Ph. D., Director.

RESULTS OF THE YEAR 1892:

1. Report of the Farm. D. N. Barrow, B. S.
2. Report of the Horticulturist. H. A. Morgan B. S. A., and F. H. Burnette.
3. Report of the Botanist. A. T. Prescott, M. A.
4. Report of the Veterinarian. Dr. W. H. Dalrymple, M. R. C. V. S.
5. Report of the Entomologist. H. A. MORGAN, B. S. A.
6. Report of the Chemist. B. B. Ross, A. M.

ISSUED BY THE BUREAU OF AGRICULTURE.

H. C. NEWSOM, Commissioner.

BATON ROUGE, LA.
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LOUISIANA STATE UNIVERSITY AND A. & M. COLLEGE.

BUREAU OF AGRICULTURE.

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The Bulletins and Reports will be sent free of charge to all farmers, by applying to Commissioner of Agriculture, Baton Rouge, La.

LOUISIANA STATE UNIVERSITY AND A. AND M. COLLEGE,
OFFICE OF EXPERIMENT STATIONS,
Baton Rouge, La.

Hon. H. C. Newsom, Commissioner of Agriculture, Baton Rouge, La.:

Dear Sir—I hand you herewith reports from the different departments of the State Experiment Station and ask that they be published as Bulletin No. 22.

Respectfully submitted,

WM. C. STUBBS, Director.

PREFACE.

The State Experiment Station at Baton Rouge, in immediate connection with the Louisiana State University and Agricultural and Mechanical College, is most thoroughly and completely equipped for all kinds of work pertaining to the agriculture of this State.

The following constitute the divisions of this Station:

1. The Experiment Farm.
2. The Horticultural Grounds.
3. The Botanical Grounds.
4. The Veterinary Infirmary.
5. The Entomological Division.
6. The Agricultural Museum.
7. The Chemical Laboratory.

Each of these divisions are earnestly at work in the interest of Louisiana agriculture and the reports given herein, show how large the range of investigations covered during the past year.

1. *The Experiment Farm,* consisting of 80 acres, is presided over by Mr. D. N. Barrow, B. S., Assistant Director, with Mr. W. B. Mercier, a graduate of the Agricultural College of Mississippi, as Farm Manager. Upon this farm, numerous experiments in the various field crops, covering physiological, manurial and variety questions, are annually made. Different breeds of cattle and chickens have been tested, and in the near future, it is contemplated to add varieties of sheep and hogs, besides increasing the present number of breeds of cattle. Upon this farm, tiled and open drainage are being comparatively tested. In the Chemical Report herein will be found the analysis of the soils of this Station, fairly typical of the "bluff soils" of this section.

2. *The Horticultural Grounds*, presided over by Mr. F. H. Burnette, with Mr. Alex. Jones as foreman of the grounds, consist of 10 acres in fruits and vegetables, with the necessary propagating and storage houses. Two trees of every obtainable variety of fruit, domestic and foreign, with the least show of adaptability to our climate, have been planted and are now being tested. Small fruits, covering grapes, raspberries, strawberries blackberries, etc., have been planted in numerous varieties and the results of each thoroughly tested. Beside the questions of varieties and adaptability, others, such as pruning, training, mulching, etc., are being extensively discussed by experiments. Vegetables of all kinds, covering the numerous and latest varieties are grown, and comparative merits of each determined. Fertilizers adapted to each are being tested. The extensive report given elsewhere will show the quantity and character of work performed. Up to last October, Prof. H. A. Morgan, the Entomologist of the Station, presided also over the Horticultural Grounds, assisted by Mr. Burnette. At this time it was found that the entomological duties of Mr. Morgan precluded close attention to Horticultural work, and Mr. Burnette was assigned to the charge of the Horticultural Grounds. The report herein given is therefore the combined work of Profs. Morgan and Burnette.

3. *The Botanical Grounds* are directed by Prof. A. T. Prescott, and consist of 10 acres, laid off so as to cover in botanical order the families, genera and species of all obtainable plants. A large number of plants have been obtained and it is designed ultimately to have every species capable of growth in this climate represented. These grounds are designed for two purposes: 1st, to acquaint the farmers and planters with the plants that can be grown here, and 2, to aid in the instruction of Botany in the classes of the college.

4. *The Veterinary Infirmary*, presided over by Dr. W. H. Dalrymple, M. R. C. V. S., consists of stables, pharmacy, and office, where diseased or disabled animals are daily treated without charge. These free clinics are productive of great good to the owners of stock as well as to the agricultural classes of the

University. Besides this daily work, Dr. Dalrymple is frequently called to the parishes of the State, to decide upon questions of contagion or infection in prevailing diseases of stock and to assist in eradicating them, if found.

Whenever duly summoned by the Police Jury of a parish on such a mission, his services are always obtainable without charge, save his actual expenses incurred on the trip. His report, found elsewhere, will show the work already performed in this line.

5. *The Entomological Division*, over which Prof. H. A. Morgan presides, consists of a Museum and Breeding House. His field is a large, and to a certain extent, an unexplored one, and his report will show how earnestly he has begun his work. A thorough investigation made by him of the Orange Insects of this State, has recently been given in a special Bulletin on "The Orange," published by this Station.

6. *The Agricultural Museum* was ably presided over by Mr. A. M. Gardner until November last, when death unexpectedly removed him. His faithful services, his strict integrity and his stainless character were all highly appreciated, and his removal from our midst was deplored by all of his associates. Dr. Dalrymple temporarily fills the place of Curator of this Museum. From this Museum thirty cases of goods have been loaned to the State exhibit at Chicago.

7. *The Chemical Laboratory* is in charge of Prof. B. B. Ross, A. M., assisted by Mr. R. E. Blouin, B. S. The work of this Laboratory has been largely published in the various bulletins already issued. A *resume* is however embodied in the report herein given. Attention is specially called to the peculiar richness in sugar of the canes grown upon these bluff lands, suggesting large profits to capitalists who would erect central factories upon these lands. The farmers are more than willing to grow cane for such factories.

With the above departments in full working order, there is required only the co-operation and support of our farmers and

planters, to solve many of the perplexing questions now confronting our agricultural interests.

The *Central Louisiana Agricultural Society* holds its monthly meetings in the Agricultural Building of the State University on the first Wednesday in each month. Mr. John McQuaid is President, and N. S. Dougherty, Secretary. All planters and farmers from the adjoining parishes are earnestly invited to attend these meetings.

REPORT ON FARM WORK.

Dr. W. C. Stubbs, Director:

Dear Sir—The Station has followed up the experiments of former years, i. e., testing varieties of corn, cotton, forage plants, poultry and live stock and learning the manurial requirements of this soil and best methods of cultivation. Cotton continues to be the staple crop; hence, we will commence this report by giving it our first attention.

COTTON. VARIETIES.

There were planted on April 12, thirty-nine varieties. The land had been thoroughly prepared by plowing in December with two-horse plow, bedded in five foot rows in February, well harrowed and opened with bull tongue. The seeds were covered with a light harrow and then rolled with a light roller. A good stand was obtained. With the exception of a slight injury by hail directly after chopping out, the crop grew as well as could have been wished. Excessive rains in June slightly diminished the prospective yield, yet the results were fairly satisfactory.

The following table, corrected for stands gives the yield per acre in lint, the percentage of lint and the percentages picked during the three periods of picking season. The table is given in the order of yield of lint per acre:

VARIETIES OF COTTON.

Name.	Per Cent. Lint.	Total Lint Per Acre.	Per Cent. First Picking.	Per Cent. Second Picking.	Per Cent. Third Picking.
Bankcroft's Herloug	31.6	1055 lbs	28.3	63.6	8 1
Peterkin's Improved	36.1	1001 "	27.0	53.0	20.0
Brook's Improved	30.8	968 "	36.0	56.2	7.8
Ellsworth	31.5	909 "	31.0	50.0	19.0
Hawkin's Improved	31.6	870 "	47.1	43.7	9.2
Tennessee Gold Dust	30.4	869 "	49.9	38.5	11.6
Early Carolina	31.8	869 "	54.3	42.0	3.7
Fishburn's	33.2	853 "	32.7	50.6	16.7
Brannon	33.7	845 "	26.6	51.9	21.5
Mexican	30.5	845 "	33.4	48.0	18.6
King's Improved	33.0	837 "	52.0	38.0	10.0
Boyd's Prolific	32.2	833 "	23.5	60.0	16.5
Peterkin's New Cluster	32.8	810 "	4.42	44.3	11.5
Southern Hope	29.2	804 "	31.1	46.5	22.4
Cook's Long Staple	28.7	800 "	33.4	51.6	15.0
Texas Storm and Drouth Proof	34.7	784 "	35.9	37.7	26.4
Peerless	31.2	783 "	40.9	50.4	8.7
Hunnicutt	31.3	782 "	68.0	24.2	7.8
Premium	31.5	773 "	49.2	45 1	5.7
Haggaman	30.8	736 "	29.1	48.1	22.8
Truitt's Improved	30.2	700 "	42.6	50.7	6.7
Okra	31.8	695 "	51.4	41.7	6.9
Excelsior	33 0	691 "	39.3	52.4	8.3
Welborn's Pet	30.4	654 "	50.3	43.6	6.1
Marston's	33.6	646 "	44.5	48.7	6.8
Kelly	32.7	641 "	39.2	42.0	18.8
Drake's Cluster	30.4	640 "	49.6	43.0	7.4
Dickson's Improved	30.4	640 "	36.6	51.7	11.7
Petit Gulf	30.0	636 "	31.7	54.3	14.0
Willis	30.1	611 "	31.2	53.5	15.3
Bolivar County	30.3	603 "	61.5	32.2	6.3
Ben Smith	32.3	596 "	32.2	51.9	15.9
Gunn	30.6	590 "	44.9	43.4	12.7
Matthew's Long Staple	29.3	570 "	51.4	37.4	11.2
Coltharp's Eureka	30.4	559 "	59.0	33.8	7.2
Cochran's Short Limbed Prolific	32.2	553 "	57.3	35.2	7.5
Smith's Standard	33.8	528 "	62.3	35.6	2.1
Allen's Silk	28.2	450 "	36.4	51.7	11.9
Roe's Early	29.3	393 "	59.0	33.6	7.4

The cotton was picked at intervals of five or six days, so as to prevent loss. For the sake of convenience, these pickings have been divided into three periods, and called first, second and third pickings.

An examination of table will show that the following gave over 50 per cent. of the total yield at the first picking, viz :

	Per cent.
Hunnicutt	68.0
Smith's Standard	62.3
Bolivar County	61.5
Coltharp's Eureka	59.0
Roe's Early	59.0
Cochran's Short Limbed Prolific	57.3
Early Carolina	54.3
King's Improved	52.0
Okra	51.4
Mathews' Long Staple	51.4
Welborn's Pet	50. 3

and may be regarded as the earliest maturing varieties.

The percentages of lint vary from 36.1 per cent. Peterkin's Improved to 28.2 per cent. Allen's Silk—very few of these varieties have given one-third of their weight in lint. The length of the fibre of these cottons have not yet been determined.

FERTILIZER EXPERIMENTS

have been of the same general character as for former years. The first planting produced a perfect stand, but after it was chopped out, it was completely destroyed by hail. A later planting was required on all the plats.

The following tables give the yields per acre in seed cotton and lint for each of the plats, Nitrogen, Phosphoric Acid and Potash :

COTTON—PLAT 12—NITROGEN.

Number of Experiment.	How Fertilized.	Yield Per Acre	
		Seed Cotton.	Lint.
1	Mixed Minerals* and 79.8 pounds Nitrate Soda	1750	591
2	Mixed Minerals and 159.6 pounds Nitrate Soda	1939	736
3	Mixed Minerals and 53.2 pounds Sulphate Ammonia	1540	520
4	Mixed Minerals and 10.64 pounds Sulphate Ammonia	2016	681
5	Mixed Minerals	1988	671
6	Nothing	1638	553
7	Mixed Minerals and 112 pounds Dried Blood	2086	705
8	Mixed Minerals and 224 pounds Dried Blood	1890	638
9	Mixed Minerals and 140 pounds Fish Scrap	2072	700
10	Mixed Minerals and 280 pounds Fish Scrap	2240	751
11	Mixed Minerals	2030	686
12	Nothing	1596	539
13	Mixed Minerals and 168 pounds Cotton Seed Meal	1932	733
14	Mixed Minerals and 336 pounds Cotton Seed Meal	1872	629
15	Mixed Minerals and 504 pounds Cotton Seed	2002	676
16	Mixed Minerals and 1008 pounds Cotton Seed	2268	766
17	Mixed Minerals	2044	690
18	Nothing	1500	507

*Mixed Minerals— { 240 pounds Acid Phosphate.
347.20 pounds Kainite.

COTTON—PLAT 13—PHOSPHORIC ACID.

Number of Experiment.	How Fertiiized.	Yield Per Acre	
		Seed Cotton	Lint.
1	Basal Mixture*, 280 pounds Dissolved Bone	1346	454
2	Basal Mixture, 560 pounds Dissolved Bone	1666	563
3	Basal Mixture, 280 pounds Acid Phosphate	1848	624
4	Basal Mixture, 560 pounds Acid Phosphate	2242	757
5	Basal Mixture	1918	648
6	Nothing	1750	591
7	Basal Mixture, 280 pounds Floats	2156	728
8	Basal Mixture, 560 pounds "	2030	685
9	Basal Mixture, 560 pounds Slag Meal	2317	775
10	Basal Mixture, 280 pounds " "	1990	682
11	Basal Mixture	2405	812
12	Nothing	1848	624
13	Basal Mixture, 280 pounds Bone Meal	2282	771
14	Basal Mixture, 560 pounds Bone Meal	2366	799
15	Basal Mixture, 280 pounds Gypsum	2247	759
16	Basal Mixture, 560 pounds Gypsum	2268	766
17	Basal Mixture	2115	714
18	Nothing	1890	638

*Basal Mixture — { 280 pounds Cotton Seed Meal. 347 pounds Kainite.

COTTON—PLAT 14—POTASH.

Number of Experiment.	How Fertilized.	Yield Per Acr	
		Seed Cotton.	Lint.
1	Meal Phosphate*, 168 pounds Kainite	1888	638
2	Meal Phosphate, 336 pounds Kainite	2072	700
3	Meal Phosphate, 42 pounds Muriate Potash	2212	747
4	Meal Phosphate, 84 pounds Muriate Potash	2170	733
5	Meal Phosphate	1988	671
6	Nothing	1498	506
7	Meal Phosphate, 42 pounds Sulphate Potash	2002	676
8	Meal Phosphate, 84 pounds Sulphate Potash	2170	733
9	196 pounds Cotton Seed Meal, 280 pounds Acid Phosphate 49 pounds Nitrate Potash	2344	792
10	84 pounds Cotton Seed Meal, 280 pounds Acid Phosphate 98 pounds Nitrate Potash	2366	799
11	Meal Phosphate	1792	605
12	Nothing	1540	520

*Meal Phosphate— 280 pounds Cotton Seed Meal.
280 pounds Acid Phosphate.

The yields here are largely influenced by the late planting and the want of perfect stands. The average of the unfertilized experiments in the Nitrogen Plat is 1578 pounds; in the Phosphoric Acid Plat, 1829 pounds; in the Potash Plat, 1519 pounds; in them all, 1654 pounds. While the average of all the fertilized plats are over 2000 pounds per acre. It is here clearly shown that the fertilizer has more than paid expenses, though the objects of the experiments, to test the form and quality of the fertilizer needed by this soil, are not clearly shown.

CORN.

Experiments in this crop embrace the variety, physiological and manurial questions.

Fifteen varieties were planted. The land was laid off in five foot rows, carefully prepared and corn planted by hand. When six inches high it was thinned to one stalk every two feet and

kept clean until laid by. The land was rather poor and as no fertilizer was used the yield generally low. When gathered, the per cent of shucks, cob and grain was carefully determined.

The results appear in the following table:

VARIETIES OF CORN.

Number of Experiment.	Name.	Per Cent. Shuck.	Per Cent. Cob.	Per Cent. Grain.	Yield Per Acre. Bushels.
1	Large White Flint				12.5
2	Golden Beauty	11	23	66	12.5
3	Champion White Pearl	16	12	72	13.2
4	Clark's Flour	8	18	74	29.4
5	Riley's Favorite	6	18	76	18.2
6	Early Mastodon	9	20	71	26.2
7	Hickory King	8	14	78	26.2
8	Blount's Prolific	10	17	73	24.6
9	Roberts	10	11	79	50.4
10	Jeff Welborn's Conscience	11	16	73	42.0
11	Creole	17	18	65	51.8
12	Piasa King	9	20	73	27.8
13	Golden Dent Gourd Seed				18.6
14	Mosby's Prolific	12	14	74	33.0
15	Improved Leaming				14.2

THE PHYSIOLOGICAL EXPERIMENTS

were of two kinds; first, to determine the minimum of distance both in the drill and the row, and second, to ascertain the best time of applying fertilizer.

The rows in the distance experiments varied from four to five feet, the hills from 18 inches to 2 feet and the number of stalks from 1 to 2. In the experiments in times of application the rows were 5 feet and there was left one stalk every 2 feet.

The following are the results:

CORN—PLAT 8.

Number of Exp't.	Distance Apart and Number of Stalks in Drill.	Width of Row.	Yield per Acre.
			Bu.
1	One stalk, 18 inches	4	42.1
2	Two stalks, 18 inches	4	67.3
3	One stalk, 2 feet	4	48.8
4	Two stalks, 2 feet	4	73.9
5	One stalk, 18 inches	5	47.6
6	Two stalks, 18 inches	5	59.6
7	One stalk, 2 feet	5	40.6
8	Two stalks, 2 feet	5	32.9
9	All fertilizers applied when planted		35.0
10	One-half applied when planted One-half applied when off-barred		40.7
11	One-third applied when planted One-third applied when off-barred One-third applied when laid-by		54.6

These corroborate the results of last year, i. e., that 2 stalks every 2 feet in a 4 foot row gives the maximum yield of corn on this land *when unfertilized.* In regard to time of application it is seen that the yield increases with number of applications. Last year two applications gave the best yield, but the season was different—a drought prevailed after the application and perhaps prevented full assimulation by the plant.

FERTILIZER EXPERIMENTS

in corn were of the same general kinds as those with cotton, but the results were very unsatisfactory and are not given.

FORAGE CROPS.

An important factor in good husbandry is an abundance of forage for stock. Our long forage is usually obtained by cutting and curing into hay cow peas or grass. Sometimes the wasteful process of pulling the green leaves from corn and curing them into fodder is pursued. But even these sources fail some times o gives us an abundance of "roughness." To supplant or even

supplement the above, recourse is now had to the many varieties of saccharine and non saccharine sorghums. To test their adaptability to our soil, ten varieties were planted April 4. The plat used had previously been occupied by similar crops. It was broken in the fall, rebedded in the spring and fined by a harrow. The sorghums were thinned when about 6 inches high to one stalk every 3 inches. The Pearl Millet and Beggar Weed (Desmodium Molle,) planted also in this plat, were left, the former, 1 stalk to every foot, and the latter, just as it came up—very thick.

The following results were obtained in green crops per acre: Large African Millet, 25,232 pounds; Pearl Millet, 21,228 pounds; Yellow Milo Maize, 25,344 pounds; White Milo Maize, 29,034 pounds; Egyptian Wheat, 14,868 pounds; Kaffir Corn, 9,728 pounds; Jerusalem Corn, 8,352 pounds; Egyptian Rice Corn, 7,392 pounds; Desmodium Molle, 19,320 pounds; Early Amber Sorghum, 1400 pounds.

These all cured well and furnish an excellent fodder, particularly when cut up with a machine into small pieces. Stock are peculiarly fond of the "BeggarWeed" and ate it in preference to all others. Many of these plants are also valuable for the large quantity of seed which they bear. These seeds, pronounced the equal of corn by many, were harvested here by the ubiquitous English Sparrow, and therefore no record can be made of their value.

Giant and Russian sunflowers were also planted on this plat with excellent results—producing, particularly the Large Russian, enormous heads of well developed seed. The latter are said to be excellent chicken food and sometimes used to give stock a sleek coating.

Chufas, a prolific nut bearing plant, in appearace like the much-dreaded "coco," but harmless, were grown with considerable success. Hogs are very fond of them and will most economically harvest a crop.

The African Ground Pea, bearing its pod under ground, is another hog feed that was tried. It was found inferior to both Chufas and peanuts.

Soja Bean, a non-running bush bean, highly prized in some sections, was unsuccessful with us.

COW PEAS.

The Whippoorwill, Conch, Black-Eyed, Unknown and Clay Pea, varieties of the common Dolichos, or as it is generally known, Cow Pea, were planted in order to test their relative merits. Of these, the Conch is decidedly the greatest vine-producer. The vine also does not grow as large as some of the other varieties, thus making it easier to cure for hay. Where this is the object irrespective of the benefits to the soil this is the pea to plant, as a quart or three pints of the seed will produce enough vines to cover an acre of land. It must be borne in mind, however, that a large part of the benefit to the soil derived from a crop of Peas is due to the roots. Therefore, where this is desired any of the others, especially the Clay, would do as well.

GRASSES, CLOVERS, ETC.

The report of this year's crop will be found in Bulletin No. 19. The planting of small plats has been discontinued. Beds of one-fifthh acre extent of the following were planted in October, and their result will be given in the report for 1893. They are: Alfalfa (Medicago sativa), Burr Clover (Medicago maculata), Red Clover (Trifolium pratense), Crimson, Scarlet or Italian Clover (Trifolium incarnatum), Kentucky Blue Grass (Poa pratensis), Rescue Grass (Bromus Schraderie), Tall Meadow Oat (Arenathecum avenaceum), Orchard (Dactylis glomerata), Italian Rye (Lolium Italicum), English Rye (Lolium perenne).

LIVE STOCK.

No additions in this line have been made. In cattle, it consists of two Holstein cows and a bull and one bull calf, a Jersey cow, a bull and a bull calf now compose the Jersey herd.

The Holsteins continue to do well. Sophia D., the oldest cow, maintains her six-gallon record, and is ably seconded by her daughter Ada, with five gallons of milk.

The Jersey Cow, Princess of Beechwood, still gives one pound and a half of butter from a little over two and a half gallons of milk.

The increase from this stock is readily sold. Since last report two bulls and a heifer have gone forth to aid by a dissemination of their blood in the improvement of the cattle of the State. The two bull calves, Jersey and Holstein, are awaiting similar missions as soon as sales are effected; price, $50 each.

The poultry tried comprised 13 breeds. With the following list is given their egg record for the hundred days commencing February 6, 1892, also the average egg production per day and hen.

POULTRY RECORD FOR THE HUNDRED DAYS, COMMENCING FEBRUARY 6.

Breed.	Total number of eggs.	Number of hens in each pen.	Average per day to hen.
White Crested Black Polish	27	1	.27
Brown Leghorn	96	2	.48
Light Brahma	26	1	.26
Silver Spangled Hamburgs	64	1	.64
Black Minorca	100	3	.33
White Plymouth Rock	15	1	.15
White Minorca	40	1	.40
Partridge Cochin*	52	2	.26
Buff Cochin	63	3	.21
Langsha †	78	2	.39
White Wyandotte‡	31	1	.36
Laced Wyandotte	28	1	.32
Barred Plymouth Rocks§	24	1	.30

* One hen died about middle of period.

† Record for 86 days.

‡ Record for 86 days.

§ Record for 79 days. First hen died and 3 weeks elapsed before she could be replaced.

This cannot be taken as an indication of the best of which any breed is capable under normal conditions. With such a

number of breeds it is necessary to confine each in a separate pen. These pens are small, only 14x18 feet, and hence no breed is at its best, nor is the effect upon their laying capacity equal. The large breeds, such as Light Brahmas, Langshans, Buff Cochin, etc., accustomed to a comparative small amount of exercise, would feel the constraint less severely than the smaller breeds, like the S. S. Hamburg, Brown Leghorn, Minorcas, etc. Yet, with this great handicap the small breeds, Silver Spangled Hamburg, Brown Leghorn and White Minorca head the list. The two former are about equal in weight of eggs produced, and as the eggs of the first are rather under-sized, the Brown Leghorn would probably be the best choice for egg producers.

For general purpose fowls the White Monorcas, Langshans and White and Laced Wyandottes are close competitors. The Langshan has the (to some) objection of being black with dark legs while the Laced Wyandotte is free from this objection and has the advantage of size over the two white competitors.

TILE DRAINAGE.

The effect of the tile continues to increase. The 40 foot tile section to give as good results as those that are closer. Perhaps this is sufficienty close upon this soil. This seems to be true for all three depths, i. e., three, three and a half and four feet. The most marked benefit from the tile is the gradual disappearance of the evil of puddling for which this soil has quite a tendency. The crust ordinarily formed on this soil by rain has almost entirely disappeared on the tiled land.

Respectfully,

D. N. BARROW,

Assistant Director.

Since the above has gone to press the following classification of the varieties of cotton, together with explanatory letter, has been received from the New Orleans Cotton Exchange :

NEW ORLEANS, May 5, 1893.

D. N. Barrow, Esq., Assistant Director State Experiment Station, Baton Rouge, La.:

DEAR SIR—Herewith I beg to hand you report of Our Arbitration Committee on Classification, on samples sent us per your letter of April 17, 1893.

Very truly yours,

H. G. HESTER,
Secretary.

NEW ORLEANS, May 4, 1893.

Henry G. Hester, Esq., Secretary Cotton Exchange, New Orleans, La.:

DEAR SIR—The Arbitration Committee on Classification has this day examined samples sent them by the State Experiment Station, Baton Rouge, La., covering 39 different descriptions, as per letter to you of April 17, 1893.

You will please say to the Director of the Experiment Station that cotton noted as *upland staple* is intended to mean the average of ordinary staple cotton handled in this market, on which the daily official quotations of the Cotton Exchange are based.

It is also well to call attention to the fact that during the current season long staple cottons have been extraordinarily low, as compared with the average staple, the premiums in many instances having amounted to very little. This fact has attracted general attention throughout the bottom lands of the South and in the Carolinas and Georgia, the latter section being the places where Sea Island cottons are grown. Whether this is attributable, as is claimed, to heavy importations of Egyptian or Peruvian cotton from abroad, is a question that is now engaging the minds of our people. While it is believed that another season may rectify these differences, the impression prevails at present that, notwithstanding the short American crop of the current season, the production of long-staple cotton has been overdone.

Very truly yours,

C. HANSON,
Chairman Arbitration Committee on Classification.

CLASSIFICATION AND VALUATION OF SAMPLES COTTON SUBMITTED TO ABITRATION COMMITTEE ON CLASSSIFCATION OF THE NEW ORLEANS COTTON EXCHANGE BY STATE EXPERIMENT STATION, BATON ROUGE, LA.

Name of Seed.	Class.	Remarks.	Value.
King's Improved	Strict Middling	Very short staple cotton, 3-4 inch	1-8 cent discount
Cook's Long Staple	Middling	1 5-16 staple	3-4 cent premium
Fishburn	Strict Middling	1 1-16 "	1-16 cent premium
Coltharpe Eureka	" "	1 5-16 "	3 4 cent premium
Haggerman	" "	1 1-16 "	1-16 cent premium
Peterkin's Improved	" "	Very short staple, 3-4 inch	1-8 cent discount
Roe's Early	" "	1 1-4 staple	1-2 cent premium
Smith's Premium	Middling	Upland cotton	No premium
Peerless	Strict Middling	" "	" "
Extra Early Carolina	Good Middling	" "	" "
Bancroft's Prolific Herlong	Strict Middling	Short staple	1-8 cent discount
Matthew's Extra Long Staple	Middling	1 3-8 staple	1 cent premium
Tennessee Gold Dust	"	Upland cotton	No premium
Brannon	"	1 inch staple	" "
Hawkin's Improved	Good Middling	1 1-16 inch staple	1-16 cent premium
Allen's Silk	Strict Middling	1 7-16 inch staple	1 1-4 cent premium
Bolivar County	" "	1 1-16 inch staple	1-16 cent premium
Welborn's Fancy Pet	Middling	Upland cotton	No premium
Truitt's Improved	Good Middling	1 1-16 staple	1-16 cent premium
Southern Hope	Middling	1 3 8 "	1 1-4 cent premium
Texas Storm and Drought Proof	Good Middling	1 1-8 "	1-8 cent premium
Okra	Strict Middling	1 1-8 "	1-8 cent premium
Ellsworth	" "	Upland staple	No premium
Brook's Improved	" "	" "	" "
Mexican	Middling	1 3-16 staple	1-4 cent premium
Peterkin's New Cluster	Strict Middling	Upland staple	No premium
Boyd's Prolific	Good Middling	" "	" "

CLASSIFICATION AND VALUATION OF SAMPLES COTTON.—CONTINUED.

Name of Seed.	Class.	Remarks.	Value.
Dickson's Improved	Strict Middling	Upland staple	No premium
Hunnicutt	Good Middling	1 1-8 staple	1-8 cent premium
Excesior	Strict Middling	Upland staple	No premium
Drake's Cluster	" "	" "	" "
Cochran's Short Limb d Prolific	Good Middling	Good Upland staple	" "
Gunn	Middling	Upland staple	" "
Kelly	Strict Middling	1 1 16 staple	1-16 cent premium
Smith's Standard	" "	3-4 staple	1-8 cent discount
Marsden	" "	1 1-16 staple	1-16 premium
Ben Smith	" "	Good Upland staple	No premium
Petit Gulf	" "	1 1-8 staple	1-8 cent premium
Willis	" "	Upland staple	No premium

Above premiums and discounts are based on current market price of middling, 7 9 16 cents per pound; strict middling, 7 11-16 cents; good middling, 7 13-16 cents. To arrive at values of any description, it is only necessary to add or deduct premium or discount named.

C. HANSON,
Chairman Arbitration Committee on Classification.

HORTICULTURAL REPORT.

Dr. Wm. C. Stubbs, Director:

Sir—The work of this department has been developed more or less by the demands made upon it. Many inquiries have come to us for recommendation of best varieties of fruits and vegetables, and we have sought to incorporate a test of varieties best adapted for Louisiana as a whole and as far as possible for the three different soils of the State which are represented by those of the three Experiment Stations. The fruit trees have not come into bearing and hence a report of these, apart from a list of those being tested will have to be deferred. The leading varieties of vegetables have been tested, as well as preliminary tests of fertilizers and methods of cultivation which will be treated of in the report to follow. We desire to call particular attention to ravages of fungus diseases, such as potato rot, melon blight, pear blight, leaf spot of strawberry, etc., and insect pests and how they may be more or less overcome by judicious treatment.

FRUITS.

The following is a list of the varieties of fruits now under test, and where plants have fruited comment will be made upon such:

APPLES.

Summer.—Carolina Watson, Early Harvest, Early Red Margaret, Jewett's Best, Horse, Nantahalee, Red Artrachan, Red June, Red May, Red Streak, Summer Queen, Yellow June, Yellow Transparent.

Fall.—Arkansas Black, Buncombe, Carolina Greening, Disharoon, Elgin Pippin, Hoover, Lauren's Greening, Shannon, Taunton, Tuscaloosa, Twenty Ounce, Watson Howard, Washington Strawberry.

Winter.—Baldwin, Ben Davis, Black Twig, Black Warrior, Cullasaga, Grand Sultan, Hockett's Sweet, Kentucky Streak, Magnum, Maverac Sweet, Romanite, Shockley, Wine Sap, Yellow Forest.

APPLES.

Crab.—Hyslop, Montreal, Transcendent, Whitney, Yates.

PEARS.

Oriental.—Daimio, Garbers, Hawaii, Keiffers, Leconte, Mikado, Mme. Von Seibold, Smiths.

Summer.—Bartlett, Belle Lucrative, Clapp's Favorite, Doyenne d'Ete, Flemish Beauty, Howell, Lawson, Petite Marguerite, Philadelphia, Reliance, Seckle, St. Michael Archangel, Stevens Genessee, Urbanist.

Autumn and Winter.—Beurre d'Anjou, Beurre Diel, Beurre Easter, Beurre Perpetuel, Duchess D'Angouleme, Hebe, Idaho, Lawrence, Vicar Wakefield, Winter Nellis.

None of the above pears have fruited, but the Oriental varieties have shown by their growth that they are well adapted to this soil and climate, all of them making a very fine growth.

QUINCES.

Angers, Champion, Fuller, Meeches' Prolific, Orange, Portugal, Rea's Mammoth.

PEACHES.

Clingstone.—Burke, Cabler's Indian, Chinese Cling, Croft's Golden, Darby, Eaton's Golden, Gen. Lee, Gen. Taylor, Indian Blood, Lemon, McKivett's Cling, Old Mixon Cling.

Freestone.—Amelia, Amsden, Alexander, Baldwin's Late, Beatrice, Berenice, Chinese Free, Countess, Crawford's Early, Crawford's Late, Downing, Early Rivers, Elberta, Elton Gold, Florida Crawford, Golden Dwarf, Hale's Early, Honey, Hoover's Heath, Imperial, Japan Dwarf Blood, Kite's Honey, Muir, Old Mixon Free, Onderdonk, Pallas, Red Ceylon, Reeve's Favorite, Silver Medal, Steven's Rareripe, Stump the World, Susquehannah, Thurber, Yellow Mystery.

Peento Type.—Angel, Bidwells's Early, Bidwell's Late, Florida's Own, Orlando, Peento, Yum Yum.

ALMONDS.

I. X. L., Japan Soft Shell, Languedoc, Ne Plus Ultra, Nonpareil, Terragon.

NECTARINES.

Boston, Victoria.

None of the above peaches, almonds, or nectarines have borne fruit. Many of them blossomed well last spring, but owing to a freeze on March 18, no fruit was produced.

In connection with the introduction of new varieties of peaches into this State we beg to call the attention of nursery men and growers to the danger of introducing a very serious insect enemy, the peach aphis, (aphis persicae-niger,) which is now doing so much damage in the State of Maryland, Delaware, New Jersey and Virginia. Like discretion should be exercised in introducing plants from districts infested with "Yellows."

PLUMS.

Oriental Group.—Bailey, Botan, Botankio, Botankio No. 1, Bongoume, Bungarine, Burbank, Chabot, Engre, Hattankio No. 1, Hattankio No. 2, Hattonkin No. 1, Hattonkin, No. 2, Haynkio, Kelsey, Kume, Long Fruited, Masu, Normand, Ogon, Okute Smomo, Prunis Pissardii, Prunis Simoni Satsuma, Red Negate, Shiro Smomo, True Sweet Botan, Ura Beni, Yesobe, Yellow Japan.

Americana Group.—DeSoto, Louisa, Quaker, Weaver, Wolf.

Wild Goose Group—Cumberland, Indian Chief, Miner, Wayand, Wild Goose.

Chikasaw Group—Caddo Chief, Jennie Lucas, Newman, Pottawattamie, Robinson.

Marianna Group,—De Caradeuc, Marianna.

Beach Plum Group.—Bassett's American.

European Group.—Spaulding, Imperial Gage, Washington, Lombard, Reine Claude de Bavay.

None of the plums have yet given sufficient fruit to judge of their merits. In selecting varieties worthy of testing we have sought to represent all the species of American wild plums, as well as the European and Oriental species.

CHERRIES.

Heart or Sweet Type.—Black Tartarian, Coe's Transparent, Early Richmond, Kirtland.

Oriental Type.—A Japan Cherry.

Sour or Morrello Type.—Louisiana Iron Clad, May Duke.

APRICOTS.

Breda, Early Golden, Eureka, Japan, Moorpark, Royal, Russian.

MEDLARS.

Nottingham, DeHolland, Rosæ.

MULBERRIES.

Russian Type.—Russian, Victoria.

Multicaulis Type.—Downing.

Red or Native Type.—Hick's Ever-bearing, Lampasas (var tomentosa).

PERSIMMONS.

Japan Type (Kaki Species).—Among, Dai Dai Maru, Hacheya, Hyakume, Kora Kami, Kuro Kume, Nero Zami, Tancuasih, Yemon (considered by many same as Among) Yedoichi, Zingi, Zingi Maru.

Mazeli Type (Mazeli species.)—Mazeli.

Native Type (Virginiana species.)—Alton.

As with the Japanese Plums, many of the varieties of the Japanese Persimmons may be found as duplicates when the fruits are produced.

FIGS.

Adriatic, Agen, Angelique, Black California, Black Province, Bourgassotte (black), Bourgassotte (white), Brown Turkey, Brianzola, Brogiotto (black), Brogiotto (white), Brunswick, Celestial, Dalmantino, Dattato (black), Dattato (white), De Con-

stantine, Early Violette, Firenze, Guingliono, Houche de Bray, Ischia (brown), Ischia (white), Lemon, Marseilles (black), Marseilles (white), Missilon, Moisonne, Monica Bianca, Osborne's Prolific, Projans, Reine Blanche, Rubado, Smyrna, Smyrna (true), White Genoa, Wonderful, Zimetza.

Besides the above we have the wild or "Capri" fig.

NOTES ON FIGS.—None of the above figs have borne in season and we are unable to judge as yet of their merits. Most of the varieties have made marked growth, and have been shaped by constant pinching and attention during the rapidly growing season, starting the main branches out near the ground and removing early in the growth such as tend to destroy the symmetry of the tree.

We are sorry to report a very serious pest of the fig tree, that of a borer, the larva of a longicorn beetle, (ptychodes trivittatus). This has proven a very serious pest in South Louisiana, infesting in great numbers the trunk and branches. Injuries to the more matured portions of the plant by the removal of branches or abrasions of the bark of any kind seems to aid the insect in its work of destruction, making *easier* its entry into the wood. We have noticed parts of the trunk exposed to the sun's rays are more liable to attack. Low training of main branches might obviate this.

ORANGES.

Dai Dai, Kawachi, Unshiu or Oonshiu (Satsuma).

The first two varieties have been completely defoliated by winter freezes, but the Unshiu budded upon Citrus trifoliata stock has retained all of its foliage despite the thermometer reaching 19° Fahrenheit.

POMEGRANATES.

Paper Shell, Spanish Ruby—neither variety has borne fruit as yet.

NUTS.

Pecans.—Stewart and Van Deman, (from seed), Centennial, Frotcher, Rome, (budded).

Walnuts.—Plants of English and Japanese species.

SMALL FRUITS.

STRAWBERRIES.

Variety.	Sexuality.	Remarks.
Beder Wood.	Bisexual.	Not sufficiently tested.
Belle.	Bisexual.	Promising.
Belmont.	Bisexual.	Not sufficiently tested.
Bomba.	Bisexual.	Promising.
Bubach.	Pistillate.	Not sufficiently tested.
Bubach No. 5.	Pistillate.	Promising.
Bubach No. 24.	Bisexual.	Promising.
Bubach No. 132.	Bisexual.	Promising.
Capt. Jack.	Bisexual.	Did not do well.
Carmichael.	Pistillate.	Rather promising.
Charles Downing.	Bisexual.	Promising.
Clingto.	Bisexual.	Did not do well.
Cloud.	Pistillate.	Very promising.
Coville.	Bisexual.	Rather promising.
Crawford.	Bisexual.	Rather promising.
Crescent	Pistillate.	Promising.
Crimson Cluster.	Pistillate.	Promising.
Crystal City.	Bisexual.	Promising.
Cumberland.	Bisexual.	Very promising.
Daisy.	Pistillate.	Did not do well.
Enhance.	Bisexual.	Very promising.
Eureka.	Pistillate.	Very promising.
Excelsior.	Bisexual.	Promising.
Farnsworth.	Bisexual.	Not sufficiently tested.
Felton.	Bisexual.	Not sufficiently tested.
Florence.	Bisexual.	Not sufficiently tested.
Gandy.	Bisexual.	Very promising.
Gold.	Pistillate.	Did not do well.
Great American.	Bisexual.	Very promising.
Great Pacific.	Pistillate.	Promising.
Gypsy.	Bisexual.	Of no market value.
Hamden.	Pistillate.	Not sufficiently tested.
Hatfield.	Bisexual.	Promising.
Haverland.	Pistillate.	One of best.
Henderson.	Bisexual.	Promising.
Hoffman.	Bisexual.	Not sufficiently tested.
Huster's Gem.	Pistillate.	Not sufficiently tested.
Indiana.	Bisexual.	Did not do well.
Ivanhoe.	Bisexual.	Only fair
James Vick.	Bisexual.	Not sufficiently tested.
Jessie.	Bisexual.	Promising.
John Little.	Pistillate.	Not sufficiently tested.
Jucunda.	Bisexual.	Not promising.
Logan.	Bisexual.	Not sufficiently tested.
Louise.	Bisexual.	Promising
Lovett's Early.	Bisexual.	Not sufficiently tested.
Manchester.	Pistillate.	Rather promising.
Mark.	Bisexual.	Not sufficiently tested.
May King.	Bisexual.	Promising.
Miami.	Pistillate (nearly)	Not sufficiently tested.
Michel Early.	Bisexual.	Promising
Middlefield.	Pistillate.	Very promising.

STRAWBERRIES—*Continued.*

Variety.	Sexuality.	Remarks.
Miller.	Bisexual.	Not sufficiently tested.
Monmouth.	Bisexual.	Very promising.
Mount Vernon.	Bisexual.	Not promising.
Mrs Cleveland.	Pistillate.	Strong grower, promising
New Hampden.	Bisexual.	Promising.
Ohio.	Pistillate.	Promising.
Ohio Centennial.	Bisexual.	Not sufficiently tested.
Ontario.	Bisexual.	Not sufficiently tested.
Parker Earle.	Bisexual.	Not promising.
Pearl.	Bisexual.	Not promising.
Pineapple.	Bisexual.	Not promising.
Pioneer.	Bisexual.	Promising.
Prince of Berries.	Bisexual.	Promising.
Sadie.	Pistillate.	Not sufficiently tested.
Sharpless.	Bisexual.	Not promising.
Stayman's No. 1.	Pistillate.	Promising.
Stevens.	Bisexual.	Very early, promising.
Thompson's No. 9.	Bisexual.	Not sufficiently tested.
Tippecanoe.	Bisexual.	Not promising
Viola.	Bisexual.	Not promising.
Warfield No. 1.	Pistillate.	Not sufficiently tested.
Warfield No. 2.	Bisexual.	Very promising.
West Lawn.	Pistillate.	Very promising.
Wilson.	Bisexual.	Only fair.
Yale	Bisexual.	Not promising.
Kentucky.	Bisexual.	Failed.
Lady Rusk.	Pistillate	Failed.

Many of the varieties of strawberries are very promising and at the close of the coming season a detailed account will be given of the behavior of each variety, as the plants are now sufficiently developed to indicate pretty correctly their value for this state. Drought and disease are the difficulties to overcome in strawberry production, when suitable varieties have been secured. Heavy mulching seems to protect the plants during continued dry weather and as moist sultry weather is most propitious for development of fungus diseases constant spraying with either Bordeaux Mixture or Ammoniacal Solution of Copper Carbonate will do a great deal to obviate the loss by "*leaf blight.*"

Owing to the difficulty of overcoming upon a rich soil the rapid development of weeds in strawberry beds, we prefer the renewing of the beds every second year, simply keeping the land as clean as possible the last year without cultivation.

RASPBERRIES.

Red Type (Strigosus Species), Cuthbert, Golden Queen, Marlboro, Turner.

Black Type (Occidentalis Species.) — Hopkins, Loretts, Progress, Tyler.

These plants, as a whole, did well last season but will require another season's test before they can be recommended or disapproved.

BLACKBERRIES.

Brunton, Dallas, Evergreen, Kittatiny, Snyder, Wilson's Early.

While all of the above varieties are more or less promising, the Brunton stands ahead of the list, bearing abundance of excellent fruit.

DEWBERRIES.

Braden (white), Coleman (white), Lucretia and Manatee (belongs to the Southern Species (trivialis). These varieties only being put out last spring, we are yet unable to pass judgment upon them. The Manatee has made an especially fine growth.

WINEBERRY.

Childs' Japan.

JUNEBERRIES.

Improved Dwarf, Success.

GOOSEBERRIES.

Downings, Golden Prolific, Houghton's Industry. These varieties have thus far made a decided failure.

CURRANTS.

Crandall, Fays, [Red [Dutch, Versailles, Victoria, White Grape. All of these varieties; like the Gooseberries, have failed, except the Crandall, which has made a good growth, and promising.

Variety.	Origin.	Where Originated	Remarks.
Agawam	Roger's V. labrusca, vinifera family	Massachusetts	Growth very promising.
Amber	V. riparia x labrusca	Missouri	" " "
America	V. lincecumi x rupestris	Texas	" " "
Bacchus	Seedling of Clinton	New York	" " "
Bailey	V. lincecumi x Triumph	Texas	Growth not vigorous
Beagle	Elvira x Black Eagle	Texas	Promising
Berckman	Clinton, Delaware	South Carolina	Growth promising
Big Black	.....	.....	" "
Big Red	V. lincecumi x Lindley	Texas	Growth good, more or less free from disease
Black Eagle	Concord x V. viniferi	New York	Poor growth
Black Hamburg	European Origin	.....	Growth inferior
Black July	.....	.....	Fair growth
Black Pearl	V. riparia x v. labrusca	Ohio	" "
Blanco	Seedling of Elvira	Texas	Vigorous growth, promising
Blood	V. lincecumi x v. bourquiniana	Texas	" " "
Blue Muscadine	.....	.....	" " "
Brilliant	Lindley x Delaware	Texas	Diseased, fair growth
Brighton	Concord x Diana Hamburg	Massachusetts	Growth vigorous
Campbell	Seedling of Triumph	Texas	" "
Catawba	V. labrusca x v. vinifera	North Carolina	Promising growth
Champion	Vitus labrusca, (accidental)	New York	" "
Clinton	V. riparia x labrusca	.....	Very vigorous growth
Concord	Vitus labrusca	.....	Promising growth
Concelva	Concord x Elvira	Texas	Fair growth
Cottage	Concord Seedling	E. W. Bull	Good growth
Cunningham	Probably seedling of Herbemont	Virginia	" "
Cynthiana	V. Aestivalis	.....	Strong growth, no disease.
Delaware	V. labrusca x v. bourquiniana	New Jersey	Good growth, promising
Diana	Seedling of Catawba	Massachusetts	" " "
Dracutt Amber	Seedling of wild v. labrusca	Massachusetts	Strong growth, some disease
Dr. Hexamer	V. lincecumi, Concord	Texas	Vigorous growth.

GRAPES—Continued.

Variety.	Origin.	Where Originated	Remarks.
Duchess	V. labrusca x v. vinifera	New York	Almost failure
Early Market	Seedling of Elvira	Texas	Fair growth, diseased
Early Ohio	....	.....	Vigorous growth
Early Victor	Seedling of Ives.....	Kansas	Fair growth, diseased
Early Wine	....	.....	Fair growth
Eaton	Seedling of Concord	Massachusetts	Medium growth, diseased
Elvira	V. riparia x v. labrusca	Missouri	Fair growth, diseased
Empire State	Hartford, ( )	New York	" " "
Etta	Seedling of Elvira	Missouri	Strong, vigorous, diseased
Eumelan	V. aestivalis with some vinifera	.....	Fair growth, healthy
Fern Munson	....	Texas	Strong growth, no disease
Flowers	V. rotundifolio	.....	Fair " " "
Goethe	Roger's labrusca x vinifera family	Massachusetts	Vigorous growth, diseased
Gold Coin	V. aestivalis x v. labrusca	Texas	Strong healthy growth
Golden Gem	Delaware x Iona	New York	Fair growth
Green Golden	V. labrusca x v. riparia	Missouri	" "
Hartford	V. labrusca	Connecticutt	" " diseased
Herbemont	V. bourquiniana	.....	Very strong growth, no disease
Herbert	V. labrusca x Hamburg	Massachusetts	Fair growth, diseased
Herman	V. bicolor x Norton	Missouri	Very strong growth, no disease
Herman Jaeger	V. lincecumi x v. bourquiniana	Texas	Fair growth, healthy
Highland	Concord x jura muscat	New York	" " diseased
Hilgard	V. lincecumi x v. bourquiiana	Texas	" " "
Husmann	V. lincecumi x Triumph	Texas	Growth strong and healthy
Iona	Seedling of Catawba	New York	Growth fair, diseased
Ives	Seedling of Hartford	Ohio	Strong growth, no disease
Jacques	Vitis bourquiniana	.....	Fair growth, no disease
Jefferson	Concord x Iona	New York	" " some disease
Lady Washington	Concord x Allen's Hybrid	New York	" " healthy
Lady	Seedling of Concord	Ohio	Unhealthy growth, not vigorous
Lindley	V. labrusca x Golders	Massachusetts	Fair growth, diseased

Variety.	Origin.	Where Originated	Remarks.
Martha's Seedling	Seedling of Concord	Pensylvania	Fair growth some disease
Mason's	" "	Illinois	Growth strong and healthy
Massasoit	Roger's labrusca, vinifera family	Massachusetts	Fair growth, diseased
Merrimac	" " " "	"	" " "
Missouri Riesling	Seedling of Elvira	Missouri	Promising growth, healthy
Montefiore	V. riparia x labrusca	"	" " some disease
Moore's Diamond	Concord x Iona	Massachusetts	" " healthy
Moore's Early	Seedling of Concord.	"	Not vigorous, diseased
Moyer	V. bourquiniana x v. labrusca	Canada	Poor growth, diseased
Mrs. Monson	V. lincecumi x v. bourquiniana	Texas	Strong growth, healthy
Niagara	Concord x Cassady	New York	Growth vigorous
Norfolk	Seedling of Catawba	Massachusetts	Fair growth, healthy
Norton's Virginia	V. aestivalis with labrusca	.....	Strong growth, no disease
Onderdonk	Seedling of Herbemont	Texas	Vigorous growth, no disease
Perkins	Chance Seedling of v. labrusca	Massachusetts	" " some "
Peter Wylie	(Halifax x vinifera) (Delaware, vinifera)	South Carolina	Not vigorous, diseased
Pocklington	Seedling of Concord	New York	" " "
Poughkeepsie	Iona x Delaware	" "	" " "
Prentiss	Seedling of Isabella	" "	Vigorous growth, some disease
Pres Lyon	Seedling of Elvira	Texas	Medium growth, badly diseased
Roanoke	Seedling of Ronk's Blue	Texas	No disease, fair growth
Salem	V. labrusca x Hamburg	Massachusetts	Vigorous growth, some disease
Scuppernong	V. rotundifolia	South Carolina	No disease, vigorous
South Florida	.....	Florida	Just planted
Sweet Mountain	V. monticola	Texas	Fair growth
T. B. Hayes	Seedling of Concord	Massachusetts	Poor growth, diseased
Telegraph	Seedling of Hartford	Pennsylvania	Strong healthy grower
Thomas	V. rotundifolia	South Carolina	Healthy growth
Triumph	Concord x Chasselas musque	Ohio	Poor growth, diseased
Ulster Prolific	V. labrusca x v. viniefra	New York	Fair growth, no disease
Van Deman	V. lincecumi x Elvira	Texas	Strong growth, healthy

GRAPES—CONTINUED.

Variety.	Origin.	Where Originated	Remarks.
Vergennes	Chance seedling of labrusca	Vermont	Poor growth, diseased
Walter	Delaware x Diana	New York	Fair growth, some disease
Wilder's No. 4	V. labrusca x v. vinifera	Massachusetts	" " diseased
Woodruff Red	" "	Michigan	Fair growth, healthy
Worden	Concord seedling	New York	Fair growth and some disease
Wyoming Red	Probably seedling of wild v. labrusca	New York	Poor growth, diseased
Zinfandel	Vitis vinifera	Foreign	Fair growth and some disease

NOTES ON GRAPES.—The above varieties will come into bearing this coming season when we shall be able to judge of their productiveness, quality, etc. The growth of many of the varieties is very promising and it is hoped, by judicious training, (we have not yet adopted any one system of training but are giving all a trial), and by the use of the suitable *fungicides*, which we are also testing, that many of the varieties may be found profitable in Louisiana.

A detailed report will be made immediately after the fruiting season.

The remarks on the fruits grown on the station have been made principally upon the growth of the plants, as, owing to the youth of this department, no fruits have yet been borne. The coming year promises well and will bring with it many interesting developments suggestive of the promising and doubtful kind of fruits.

TREATMENT OF PLANT DISEASES.

During the past season we have sought to overcome the diseases affecting fruits, by the use of *fungicides*. The two found most general in their good effects were Bordeaux mixture and ammoniacal solution of copper carbonate.

They are prepared as follows:

1. *Bordeaux Mixture.*—Dissolve 6 pounds copper sulphate in 6 gallons of water. In another vessel slack 4 pounds of fresh lime after which add enough water to it to make thin whitewash, which is then poured into the vessel containing the copper sulphate solution, straining the whitewash throug a brass sieve. Dilute the whole with water to 30 gallons. Prof. Beach, of Geneva, suggests a means of making the Bordeaux mixture, which obviates the weighing of the lime. After dissolving the copper sulphate add the whitewash prepared from fresh lime, until the mixture ceases to turn a dark color when a couple of drops of potassium forocynanide (saturated aqueous solution) is added.

2. *Ammoniacal Solution of Copper Carbonate.*—Mix thorougly 6 ounces of pulverized copper carbonate in 3 pints of ammonia, having a strength of 26°. Three pints may not be sufficient to

dissolve all of the copper carbonate—if not, more is added. This should be kept in an air-tight vessel, and when used dilute with forty gallons of water.

VEGETABLES.

ASPARAGUS.

An effort has been put forth to produce a crop of asparagus, and, of the varieties tested, three are quite promising:

Varieties.	Remarks.
Barr's Mammoth....	Shoots large, excellent, first cutting, Feb. 15. Promising.
Conover's Colossal..	Very large and fine, first cutting Feb. 20. Promising.
Moore's Crossbred ..	Few shoots, large size, quality good, first cutting March 1.
Palmetto	Inferior, late and least promising of all.

The beds of the above varieties have not been long enough established to determine the value of the individual variety.

BEANS.

Varieties.	First Picking.	Best Picking.	Last Picking.	Total Yield Per 8 Feet.
Best of All.....	June 1	June 10	June 20	3 lbs. 2 oz.
Black Wax.....	May 14	May 20	June 1	5 " 8 "
Heroman's Bunch Bean.....	May 12	May 19	June 1	2 " 3 "
Dwarf Horticultural	May 14	May 18	June 10	3 " 6½ "
Dutch Case Knife (Pole)....	June 1	June 8	June 18	2 " 12½ "
Early Golden Cluster, (Pole)	June 2	June 10	June 21	12 " 15½ "
Ivory Pod Wax.....	May 12	May 19	June 2	2 " 8 "
Large White Marrow.....	May 19	May 27	June 1	4 " 1 "
Low's Champion	May 12	May 19	June 1	2 " 13 "
New Golden Wax....	May 12	May 20	June 1	4 " 8 "
Prolific Tree.....	May 18	June 1	June 12	3 " 6½ "
Thorborn's Ex Early Refugee	May 10	May 15	June 5	2 " 8 "
Wardell's New Kidney Wax	May 13	May 19	June 5	6 " 4 "
White Runner.....	June 1	June 15	June 21	3 " 6 "

The seed for the first crop, (record seen above,) was sown March 10, and for second crop four weeks later.

Wardell's New Kidney Wax, New Golden Wax, Yosemite Wax and Thorborn's Extra Early Refugee are recommended for first crop, and for second crop, the same with Prolific Tree and Early Golden Cluster.

BEETS.

Varieties.	Planted.	Matured.	Roots Per 10 Feet.	Weight.
Bastian's Extra Early Blood	January 30	May 27	12	8 pounds, 2 ounces
Dewing's Improved Blood	" "	" 21	19	11 " 6 "
" " " (transplanted March 7)	" "	" 24	14	11 " 1 "
Early Bassano	" "	April 28	14	8 " 6 "
Early Egytian	" "	May 21	19	6 " 3 "
Eclipse	" "	April 25	26	15 " 10 "
Eclipse (transplanted March 7)	" "	May 24	17	8 " 1 "
Edmund's Turnip	" "	" 30	13	6 " 4 "
Edmund's Turnip (transplanted March 7)	" "	" 24	13	9 " 12 "
Egyptian Early Red Turnip	" "	" 2	22	5 " 3 "
Extra Early Bassano	" "	" 2	11	2 " 14 "
Golden Giant (Mangold)	" "	" 21	11	11 " 9 "
Golden Tankard (Mangold)	" "	" 22	17	14 " 13 "
Half Long Blood	" "	" 24	13	11 " 1 "
Imperial Long Blood	" "	" 17	15	17 " 10 "
Improved Early Blood	" "	" 5	21	7 " 4 "
Lane's Imperial Sugar (Sugar Beet)	" "	" 20	9	10 " 3 "
Large Yellow Oberndorf (Mangold)	" "	" 30	12	9 " 6 "
Lentz	" "	" 17	17	12 " 9 "
Long Blood	" "	" 2	12	11 " 7 "
Mammoth Long Red	" "	" 24	12	10 " 10 "
Mitchell's Perfected	" "	" 24	13	8 " 8 "
Mitchell's Perfected (transplanted March 7)	" "	" 21	12	7 " 6 "
New Half Long Red	" "	" 27	11	16 " 11 "
Orange Globe (Mangle)	" "	June 2	15	10 " 4 "
Simon's Early Red Turnip	" "	May 21	21	10 " 1 "
Simon's Early Red Turnip (transplanted March 7)	" "	" 24	16	10 " 0 "
Yellow Turnip	" "	" 25	19	19 " 0 "

Seed were sown for the first crop January 30, and at intervals of four weeks for the successive crops. For fall and winter they were sown the latter part of August.

RECOMMENDATIONS.

Early Egyptian, Improved Early Blood, Early Bassano, Eclipse and Mitchell's Perfected. The transplanted varieties brought an earlier and a larger product, only in one instance, that of the Edmund's Turnip.

BORECOLE OR KALE.

Two varieties of this vegetable were grown: Dwarf Green Curled Scotch and Tall Curled. Sown in September and October, they remained ready for use during the whole winter until March.

BRUSSEL'S SPROUTS.

The two varieties, Dwarf Improved and Tall French, grew vigorously and made fine buds, but not being grown except in a very limited way, mostly in private gardens, they do not find a ready sale.

CAULIFLOWERS.

It requires great care and a rich, moist and somewhat cool location to grow cauliflowers at Baton Rouge. The only salable heads were obtained from September sown seeds. These were sown in a seed frame and screens used to protect the young plants from the sun's rays. October 1, they were transplanted to the field and by frequent watering a fair stand was obtained. The seed used was American grown and obtained from Francis Brill, Long Island.

Varieties—Erfurt Extra Dwarf, head small and fair, matured February 3; Early Snow Ball, head small, very white and attractive, ready for use February 1; World-beater, heads large and ragged.

CABBAGE—VARIETIES.

Varieties.	Source of Seed.	Date of Head First Matured.	Average Weight from Six Heads.
Bristol Late Flat Dutch	*Brill.	Jan. 20.	4 lbs. 5 oz.
Crescent City Large Late Flat Dutch	†Frotscher	Feb. 17.	4 lbs. 12 oz.
Drumhead Savoy	Frotscher.	Dec. 30.	5 lbs. 2 oz.
Extra Early Etampes	Brill.	Dec. 24.	2 lbs. 8 oz.
Early Jersey Wakefield	Frotscher.	Dec. 29.	4 lbs. 14 oz.
Early York	Frotscher.	Jan. 10.	1 lb. 4 oz.
Early Flat Dutch	Frotscher.	Jan. 10.	4 lbs. 10 oz.
Early Large Oxheart	Frotscher.	Jan. 1.	3 lbs.
Early Drumhead	Frotscher.	Jan. 10.	3 lbs. 11 oz.
Early Large York	Frotscher.	Jan. 12.	2 lbs. 11 oz.
Early Winningstadt	Brill.	Jan. 25.	3 lbs. 10 oz.
Early Dwarf Savoy	Frotscher.	Feb. 8.	3 lbs.
Fottler's Deephead Brunswick	Brill.	Jan. 20.	4 lbs. 6 oz.
Green Globe Savoy	Brill.	Jan. 25.	3 lbs. 10 oz.
Henderson's Succession	Brill.	Jan. 10.	3 lbs. 9 oz.
Henderson's Early Summer	Brill.	Jan. 30.	3 lbs. 8 oz.
Improved Early Summer	Frotscher.	Jan. 10.	4 lbs.
Improved Large Late Drumhead	Brill.	Jan. 23.	6 lbs. 14 oz.
Improved Large Drumhead	Frotscher.	Jan. 23.	4 lbs. 8 oz.
Large Early Jersey Wakefield	Brill.	Dec. 29.	3 lbs. 9 oz.
Large Late Flat Dutch	Frotscher.	Feb. 17.	8 lbs. 1 oz.
Large Flat Brunswick	Frotscher.	Feb. 10.	3 lbs. 4 oz.
Large Red Drumhead	Frotscher.	Feb. 25.	3 lbs. 7 oz.
Louisville Extra Drumhead	Brill.	Jan. 12.	4 lbs. 15 oz.
Nonsuch	Brill.	Jan. 10.	5 lbs. 9 oz.
Newark Early Flat Dutch	Brill.	Jan. 20.	3 lbs. 2 oz.
New Main Crop Cabbage, No. 28	Burpee.	Jan. 23.	6 lbs. 2 oz.
Perfection Drumhead Savoy	Brill.	Feb. 8.	2 lbs. 8 oz.
Premium Late Flat Dutch	Brill.	Jan. 20.	4 lbs. 13 oz.
Red Dutch	Frotscher.	Feb. 25.	3 lbs. 7 oz.
Surehead	Brill,	Jan. 23.	4 lbs. 7 oz.
St. Denis or Chou Bonneuil	Frotscher.	Feb. 17.	5 lbs. 5 oz.
Stein's Early Flat Dutch	Frotscher.	Jan. 12.	5 lbs. 2 oz.
True Early Jersey Wakefield	Brill.	Jan. 4.	2 lbs. 8 oz.
Vandergaw	Brill.	Jan. 23.	3 lbs. 14 oz.
Warren Stone Mason	Brill.	Jan. 11.	4 lbs. 13 oz.
Worldbeater	Brill.	Jan. 20.	4 lbs 14 oz.

*Francis Brill, Hempstead, Long Island, N. Y. †R. Frotscher, New Orleans.

CABBAGE.

Sowings of cabbage were made in September of 1891, also in January and March 1892, affording a succession of crops from January until June and July. The record given above is of a single sowing made in September last. Seed were sown September 3, in the seed bed and transplanted to the field October 3.

Heads were sold from the plot from December 24, until March 8. For early heads there is no variety that excels the Extra Early Etampes. Following this closely are the Early Jersey Wakefield and Early Large Oxheart. For larger and later heads Stein's Early Flat Dutch, Surehead and Drumheads are the best. New Main Crop No. 28, a new cabbage sent out by Burpee & Co., of Philadelphia, gave good heads and seems to be promising.

EXPERIMENT NO. 2—CABBAGE—FERTILIZERS—VARIETY USED, BRISTOL LATE FLAT DUTCH.

No. of Experiment	Kind and Quantity.	Average Weight From Six Heads.
1	1000 pounds cotton seed meal	5 lbs. 3 oz.
2	300 pounds acid phosphate	6 lbs. 7 oz.
3	100 pounds sulphate of potash	5 lbs. 1 oz.
4	No manure	5 lbs. 8 oz.
5	1000 pounds cotton seed meal 300 pounds acid phosphate	7 lbs. 2 oz.
6	1000 pounds cotton seed meal 100 pounds sulphate of potash	6 lbs. 12 oz.
7	300 pounds acid phosphate 100 pounds sulphate of potash	6 lbs. 14 oz.
8	1000 pounds cotton seed meal 300 pounds acid phosphate 100 pounds sulphate of potash one application at time of planting.	6 lbs. 15 oz.
9	No manure	6 lbs. .....
10	1000 pounds cotton seed meal 300 pounds acid phosphate 100 pounds sulphate of potash In three applications.	9 lbs. 8 oz.
11	500 pounds nitrate of soda	9 lbs. 9 oz.
12	400 pounds nitrate of soda	8 lbs. 3 oz.
13	300 pounds nitrate of soda	8 lbs. 10 oz.
14	100 pounds nitrate of soda	8 lbs. 5 oz.
15	200 pounds nitrate of soda, in one application	8 lbs. 6 oz.
16	200 pounds nitrate of soda, in two applications	6 lbs. 5 oz.
17	200 pounds nitrate of soda, in three applications	7 lbs. 4 oz.

From the above phosphoric acid is indicated needful, as, where nitrate of soda was used, and which gave increased results, the heads were not good, being flabby and of little value. The three applications of cotton seed meal, phosphoric acid and sulphate of potash gave an increased yield, but in comparison to the heads produced by the one application they were valueless, being soft and flabby.

CARROTS.

Varieties—(all Ford's seeds.)	Sown.	Gathered.	Weight of Ten Feet, in pounds.
Oxheart	Jan. 30.	May 21.	6 13-16 lbs.
New Chantenay	.....	May 24.	7 5-16 lbs.
Improved Long Orange	.....	May 25.	5 7-16 lbs.
Danver's Intermediate	.....	May 21.	6 13-16 lbs.
Carentan Early Half Long Scarlet	.....	May 25.	4 1-8 lbs.
Large White Belgian	.....	June 6.	11 lbs.
St. Valleries	.....	June 4.	4 7-8 lbs.
Half Long Scarlet Stump-rooted	.....	May 30.	6 3-4 lbs.
Early Scarlet Horn	.....	June 4.	7 1-4 lbs.
Large White Vosges	.....	June 1.	10 3-16 lbs.

The Oxheart and Danver's Intermediate produced edible roots the earliest. The large White Belgian and Large White Vosges, although field carrots and grown for stock commonly, sell well when pulled young, as they make a neat and attractive bunch. Early Scarlet Horn is one of the best garden varieties.

CELERY.

This plant, like the asparagus and cauliflower, requires extra attention in the South, and when this care is given may be perfected and made profitable.

The general crop of celery is of necessity grown in winter, matured and bleached in early spring. For this crop the plants may be secured in two ways, viz, (1) by growing them at home and (2) by getting them from the North. The difficulty of protecting the young plants during the hot months for September's transplanting may cause us to prefer getting the plants from the North, where they may be procured for from $3 to $4 per 1000. We have been more uniformly successful in importing our plants. In growing plants at home sow seed in June and July upon surface of ground and cover with board or damp sack until germinated, after which the plants will require protection from the sun's rays by lath screens.

In the South it is better to plant in beds, and the system suggested by Prof. Massey, of North Carolina Experiment Station, has been found to be the best. It consists in planting the celery in beds of 5 feet wide and of any length desired, leaving 5 feet of a space between each bed. In the bed the plants are placed in rows 12 inches apart and 6 inches in the row. As soon as the plants begin to grow—the growth depending very largely upon the variety, fertility of soil and climatic conditions—small quantities of earth is placed around plants, compelling them to grow more upright, not using any more earth than will hold the leaves upright. This supporting of the plants with earth should be done when the lopping condition of the leaves demand it—but from 3 to 5 handlings will be found sufficient. To facilitate this handling and to guard against the getting of the earth between the leaves the tops of each plant are held together with a single wrap of string while the earth is being shoveled in between the rows.

The time of bleaching will, of course, depend upon time of transplanting, growth of plants, etc., and in South Louisiana, where September and October are nearly as warm as July and August, it may be well to defer the transplanting of celery until the latter part of October, and during the cold spells of the winter months protect the tender varieties with straw. In this way the White Plume, which is a very desirable table variety, may be grown without interference from frost.

By later transplanting we escape the fall drought, which is a very serious obstacle where watering facilities are not good. The months of February, March and first part of April comprise the most desirable time for developing and bleaching celery.

The varieties tested without protection were White Plume and Perfection. Many of the plants of the White Plume were killed (thermometer reaching 19° Fahrenheit), but the Perfection stood the freeze and promises an abundant crop.

CORN.

For two seasons we have endeavored to make a test of the varieties of sweet corn, but have failed on account of the com-

pleta or partial destruction of the ears by the "ear worm" (boll worm) (Heliothus armiger). By planting a single variety for succession of crops, we have found that in the later crops much less damage is done. Our succession crops have been made entirely with Stowell's Evergreen, which we stongly recommend as a sugar variety. Among the others, which promised well before becoming infested, were Extra Early Dwarf Sugar, Early Cory and Adam's Early*.

CUCUMBERS.

Varieties.	First Picking.	Last Picking.	Yield.	Remarks.
Early Russian	May 15.	June 21.	23 7-8 lbs.	Per 2 hills containing 2 plants each.
Early Short Green	June 1.	July 19.	9 5-8 lbs.	" " "
Improved Early White Spine	June 3.	July 5.	27 13-16 lbs.	" " "
Improved Long Green	May 20.	July 19.	26 1-2 lbs.	" " "
Long White Spine	May 27.	July 20.	17 1-4 lbs.	" " "
Nichols' Medium Green	May 20	July 19.	24 1-2 lbs.	" " "
Paris Pickling	May 24.	July 15.	25 1-2 lbs.	" " "
Prolific Green	May 18.	July 5.	14 11-16 lbs.	" " "
Siberian	May 10.	July 15.	19 7-8 lbs.	" " "
Thorburn's Ever-bearing	May 20.	June 21.	14 3-4 lbs.	" " "
Westerfield's Chicago Pickle.	May 19.	July 19.	13 3-16 lbs.	" " "

For early cucumbers we would recommend the Siberian and Early Russian. Early production is becoming more and more important because of the increasing prevalence of diseases affecting cucurbits, and we have been less troubled with these diseases very early in the season. For greatest yield the Improved Early White Spine stands at the head of the list and is a very desirable variety.

*Over twenty varieties of sugar corns have been successfully grown at Audubon Park, New Orleans —W. C. S.

EGG PLANTS.

Varieties.	Number of Plants.	Sown.	Set in Field.	Date of First Picking.	Whole Number of Fruit.	Whole weight.	Average.
New Orleans Market, (Frotscher)	6	Jan 23	April 4	June 27	20	33 lbs. 14 oz.	1 11-16 lbs.
Dwarf Purple...	6	Jan. 23	April 4	June 25	34	9 lbs. 14 oz.	4.6 oz.
Round White....	6	Jan 23	April 4	July 10	23	12 lbs. 12 oz.	8.8 oz.

There is a great demand for extra early egg plants and for this purpose the Dwarf Purple takes the lead. It produces heavily, although the individual fruits are not large. For general crop the New Orleans market is preferred and sells much better in the Baton Rouge market than the Round White.

LETTUCE.

Varieties.	Date When Marketable.	Average Weight.
Big Boston	May 3	9 oz.
Black Seeded Simpson	May 20	1 lb.
Early Prize Head	May 11	10 oz.
Early Tennis Ball	May 30	11 oz.
Denver Market	May 2	12 oz.
Golden Heart	April 30	10 oz.
Henderson's New York	May 19	12½ oz.
New Orleans Passion	April 25	7 oz.
Tomhannock	May 2	10 oz.

Seed were sown February 5, for the first crop and at intervals of four weeks until May. Of the varieties grown on the plots, those recommended are New Orleans' Passion, an early variety of great merit; Golden Heart and Henderson's New York for later use.

MUSTARD.

Two varieties of mustard were grown during the year—Brown or Black and New Chinese. The New Chinese was always in demand on account of its large and succulent leaves, which have a slightly sweeter taste. Sowings were made in January, March, May, September and November, affording "greens" from October until June.

ROQUETTE.

This is highly prized by a few people, who know its merits, and at Baton Rouge its sale is very limited. It is a very healthy salad and deserves a place in every garden.

MUSKMELONS.

Varieties.	Sown.	First to Ripen.	No. of Fruit.	Average Weight.	Remarks.
Baltimore	Mar. 21.	June 24.	4	2 lbs.	Good.
Banana	"	July 4.	3	3 1-8 lbs.	.....
Bay View	"	June 25.	3	2 1-8 lbs.	Set well with fruit.
Bird Cantaloupe*	"	.....	..	.....	.....
Casaba	"	June 22.	3	5 1-16 lbs.	Prolific and fine garden variety.
Champion Market	"	" 29.	4	2 1-16 lbs.	Not desirable at the Station.
Early Hackensack	"	" 25.	3	2 5-16 lbs.	A fine old sort.
Emerald Gem	"	" 23.	8	7-8 lb.	Early, prolific and very sweet.
Delmonico	"	" 26.	2	4 1-2 lbs.	Promising.
Mango	"	" 25.	50	3-8 lb.	Novelty.
Miller's Cream Nutmeg.	"	July 4.	6	2 3-8 lbs.	A good garden variety.
Montreal Market *	"	.....	..	.....	....
Netted Gem	"	June 27.	3	2 5-16 lbs.	Good.
Osage	"	" 27.	2	2 3-16 lbs.	Good.
Princess	"	July 4.	4	4 lbs.	One of the best.
Surprise	"	" 27.	3	2 3-16 lbs.	Did not set well.

*Failure.

Varieties of muskmelons were planted March 21, but repeated sowings were made on account of the ravages of the cucumber beetle and the 12-spotted beetle. Nothing in the way of treatment aided in getting a stand, except cloth-covered boxes. The few fruits recorded from the vines are due to the fungus disease which attacked the vines about July 6. Fungicides were used, but without avail. A study of this blight will be made this coming season.*

*New Orleans market has succeeded well at Audubon Park, where a score or more of other varieties failed,—W. C. S.

WATERMELONS.

Varieties.	Sown.	First to Mature.	Its Weight.	No. of Fruit.	Remarks.
Cuban Queen	Mar. 15	July 6.	15 1-2 lbs.	9	Solid and crisp
Delaware	" "	" 7.	21 lbs.	7	Long and solid, good.
Fordhook Early	" "	" 4.	14 1-2 lbs.	6	Early and fair.
Florida Favorite	" "	" 30.	15 1-2 lbs.	9	Good.
Green and Gold	" "	" 22.	17 lbs.	5	Handsome.
Johnson's Christmas	" "	" 30.	24 1-2 lbs.	6	Hard rind, good keeper, good quality.
Jordan's Gray Monarch	" "	" 29.	20 lbs.	7	Large and popular.
Jones	" "	Aug. 12.	12 lbs.	3	Very sweet.
Kolb's Gem	" "	July 4.	18 lbs.	14	Prolific, average quality
Kentucky Wonder	" "	Aug. 12.	15 1-4 lbs.	4	Very desirable.
Mammoth Iron Clad	" "	July 21.	29 1-2 lbs.	7	Fair for field culture.
Mountain Sweet	" "	" 30.	23 lbs.	8	One of the sweetest.
Peerless	" "	" 5.	15 lbs.	7	Good.
Phinney's Early	" "	" 3.	17 lbs.	9	Very early and prolific.
Pride of Georgia	" "	Aug. 4.	25 lbs.	7	Rather late, but fair.
Rattlesnake	" "	July 27.	15 3-4 lbs.	10	Very desirable for the garden.
Ruby Gold	" "	" 11.	13 1-2 lbs.	8	A novelty, quality not above average.
Scaly Bark	" "	" 27.	13 lbs.	13	Fine and prolific.
Seminole	" "	" 4.	15 1-2 lbs.	11	Good.
Sibley's Triumph	" "	" 23.	16 lbs.	10	Quality good.
T. J. Bird	" "	" 6.	15 3-4 lbs.	8	Good variety for garden
Triumph of Asia	" "	" 12.	12 lbs.	4	Small, round, sweet.
Volga	" "	" 10.	12 1-2 lbs.	7	" " "
White Gem	" "	" 15.	13 lbs.	6	Novelty, handsome.

Great trouble was had in getting a stand on account of the beetles mentioned under mushmelons, but boxes covered with cheese cloth proved a success. Hills were laid out in rows of 10 feet apart and 8 feet in the row.

OKRA.

Varieties.	Seed Sown.	First Picking.	Last Picking.	Yield.	No. of Plants.
Dwarf Green	April 4.	July 3.	Aug. 25.	57 lbs. 6 oz.	15
Tall Growing	April 4.	July 28.	Aug. 30.	34 lbs. 15 oz.	15
White Velvet	April 4.	July 10.	Aug. 20.	46 lbs. 13 oz.	15

This is one of the most popular vegetables grown in the South, being very prolific and universally eaten. Of the three varieties grown on the Horticultural grounds the Dwarf Green was the earliest and most prolific, this and the Tall Growing are grown extensively. White Velvet is very tender and its white velvety pods are very attractive in the market. It is also very prolific. The seeds of this plant will not germinate well until the ground becomes well warmed. No seeds are allowed to ripen until late in the season, as the energies of the plant will then be drawn from the formation of new pods.

PEAS.

Varieties.	First Picking.	Best Picking.	Last Picking.	Weight in Pounds from Eight Feet.
First Early Varieties.				
McLean's Blue Peter	April 18.	April 30.	May 12.	1 5-8
New Dominion	" 8.	May 6.	" 18.	2 3-4
Maud S.	" 4.	April 30.	" 18.	4 3-16
Alaska	" 3.	" 30.	" 21.	5
Rural New Yorker	" 8.	" 18.	" 18.	3 1-8.
First and Best	" 7.	" 21.	" 15.	3 1-16
Second Early Varieties.				
Dwarf Sugar	" 22.	May 6.	" 18.	4
Horsford's Market Garden	" 30.	" 6.	" 25.	4 3-4
Telephone	" 22.	" 6.	" 25.	6 1-4
Quality	" 22.	" 6.	" 18.	1 7-8
Bliss' Abundance	" 22.	" 6.	" 18.	3 7-8
Pride of the Market	" 30.	" 6.	" 18.	1 15-16
McLean's Advance	" 18.	April 30.	" 25.	4 1-16
Late Varieties.				
Saxton's Evolution	May 6.	May 15.	" 25.	1 13-16
Champion of England	April 30.	" 12.	" 25.	7 1-16
Yorkshire Hero	" 30.	" 6.	" 18.	2 9-16
Black-Eyed Marrowfat	" 29.	" 12.	" 29.	3 9-16
Dwarf White Marrowfat	May 1.	" 6.	" 30.	6
Stratagem	" 6.	" 12.	" 25.	3 1-8
Dwarf Varieties.				
Blue Beauty	April 18.	April 22.	" 18.	2 13-16
American Wonder	" 8.	" 18.	" 12.	2 1-16
McLean's Little Gem	" 18.	" 30,	" 18.	3 7-8
Premium Gem	" 8.	" 22.	" 18.	2 5-8
Early Prize	" 18.	" 30.	" 18.	3 3-8

RECOMMENDATIONS.

Early Peas.—Alaska and Maud S.

Second Early.—Telephone (*an abundant bearer*); Horsford's Market Garden and Dwarf Sugar.

Late.—Champion of England and Dwarf White Marrowfat.

Dwarf.—Early Prize, Blue Beauty and American Wonder.

PEPPERS.

Varieties.	When Salable.	Remarks.
Golden Upright..	June 15	A large upright pepper of good quality.
Procopp's Giant.....	July 1	Very large, but not prolific.
Ruby King.....	July 1	Very large, very prolific.
Dwarf Early Red.....	July 25	Small flat pepper, very prolific.
*Coral Gem Bouquet.....	July 2	Handsome and may be used for sauce.
*New Fancy Wrinkled...	July 4	A new introduction from Burpee & Co, medium size and very prolific.
Red Etna.....	July 1	A good Variety.
Red Cluster.....	June 21	Another good variety, prolific and popular
*Child's Celestial.....	June 30	Very handsome in appearance, and prolific
Large Cayenne.....	July 1	A good old sort, prolific and popular.
Sweet Spanish Monstrous	June 20	Best variety for early market, sold green

*Ornamental.

The following may be sold green for sweet pepper: Golden Upright, Dwarf Early Red, Ruby King and Sweet Spanish Monstrous.

IRISH POTATOES—TEST OF VARIETIES.

Experiment No. 1.—A test of sixty varieties of Irish potatoes was made upon unfertilized land and from the results little or no information is obtained as to the best variety of the long list offered to the public.

The only three varieties yielding over 100 bushels per acre, viz.: Queen of Roses, 196 bushels per acre; Burbank, 183 bushels per acre; Peerless, 159 bushels per acre.

The lowest yield was given by Mitchell's Seedling, that of 5.77 bushels per acre.

EXPERIMENT NO. 2—TEST OF FERTILIZERS.

No. of Exp't.	Kind and Quantity.	Yield Per Acre, Bushels.		
		Salable.	Culls.	Total.
1	1000 pounds cotton seed meal	300.17	45.37	345.54
2	300 pounds acid phosphate	300.93	45.37	346.30
3	100 pounds sulphate of potash	194.33	29.08	223.41
4	No manure	201.27	27.72	228.99
5	1000 pounds cotton seed meal 300 pounds acid phosphate	316.46	23.26	339.72
6	1000 pounds cotton seed meal 100 pounds sulphate of potash	267.52	37.22	304.74
7	300 pounds acid phosphate 100 pounds sulphate of potash	267.59	38.39	305.98
8	1000 pounds cotton seed meal 300 pounds acid phosphate 100 pounds sulphate of potash	216.40	43.04	259.44
9	1000 pounds cotton seed meal 300 pounds acid phosphate 100 pounds sulphate of potash — In three applications	233.88	51.19	285.07
10	1000 pounds cotton seed meal 300 pounds acid phosphate 100 pounds sulphate of potash — Rural Method	506.47	3.47	509.92

From the above table it will be perceived that by the application of fertilizers the yields were increased in every case, except where potash was used alone when the yield fell below the unfertilized experiment. While this soil does not yield readily to fertilization, yet it will be seen that the application of nitrogen and phosphoric acid are beneficial.

EXPERIMENT NO. 3.

Method of Planting.	Yield Per Acre.		
	Salable.	Culls.	Total.
On the level	381.00	27.92	408.09
Usual ridge system	201.27	27.72	228.99
Usual ridge system (hilled)	242.00	23.26	265.26
Rural system, with pine straw	321.11	13.97	335.08
Rural system, with long hay	339.73	9.30	349.03

There is yet something to be learned regarding the treatment of the Irish potato upon our "bluff" soil. The yield upon the level is unusually large, but that from the "Rural System" is

in keeping with the results procured other seasons. It has always been the case that but few *culls* were gotten from potatoes planted under the "Rural Method." Just here we call attention to the yield under this system under fertilizers and also to the very few culls *produced.*

The "Rural System" consists in cleaning out a furrow after the land is prepared, with a plow to the depth of 6 inches. These furrows are made 3 feet apart. Plant the potatoes in bottom of furrow, and over these place about 2 inches of fine soil, upon which may be scattered the fertilizers, then lay in the furrow about 2 inches deep of straw or hay, (usually cut into pieces 2—4 inches long), then the furrow is completely filled in and rounded up. The hay or straw collects the moisture, forbids it coming immediately in contact with the planted piece of tuber, and holds it at the disposal of the tubers when it is required—during drought.

EXPERIMENT NO. 4—DISTANCES OF PLANTING IN ROW.

Distances of Planting in Row.	Yield Per Acre, in Bushels.		
	Salable.	Culls.	Total.
Four inches	248.98	48.86	297.84
Eight inches	337 60	74 46	412.06
Twelve inches	248.98	44.09	293.07
Sixteen inches	175.68	33.74	209.42
Twenty inches	129.14	20.94	150 08

The yield at the distance of 8 inches in the row is larger than that procured during other seasons, but the percentage of small tubers or culls remain about the same. The results from planting 12 inches in the row are most satisfactory and can be more safely recommended.

EXPERIMENT NO. 5.

Number of Eyes to Plant.	Yield Per Acre in Bushels.		
	Salable.	Culls.	Total.
One eye	272.25	24.43	296.68
Two eyes	293.19	38.40	331.59
Three eyes	248.98	41.48	290.86
Four eyes	205.93	31.41	237.34
Whole tubers, small size	289.70	41.80	331.50
Whole tubers, large size	337.40	70.97	408.37

The results given above are in keeping with those gotten from other trials, both at this Station and at others. The results from *two eyes* are equal to those from small tubers. If potatoes are very cheap at planting time whole tubers may be planted with profit, but if not, pieces containing from two to three eyes should be used.

EXPERIMENT NO. 6—FALL CROP.

For many years a great number of truckers have been more or less successful in producing a fall crop of Irish potatoes. Failure from time to time indicated that the method of spring planting was not the one for fall, and constant effort and experiment brought about the adoption of the following, which conditions are the only successful ones in producing a good fall crop:

(1) Planting of whole tubers.
(2) Sprouting of tubers before planting.
(3) Planting on the level and deeply in the furrow.
(4) Filling in the furrow as the plants grow.

The only condition which may require direction to accomplish is No. 2. For many years potatoes for fall planting have been stored under building and there, while given plenty of light, yet protected from sun's rays, have been allowed to green over. This has been a very successful step towards the getting of a fall crop, but a more successful way and one which carries the preparation a little further has been treated of by Prof. Massey, of North Carolina, in a bulletin published by the Experiment

Station. It consists in spreading out the tubers in a single layer after they have been "greened" (by being spread out under shades of a tree or under house, etc.) Cover with a couple of inches of sandy soil and then with six inches of hay or straw, which is kept moist (not wet). In a short time the eyes will begin to sprout, when the tubers should be planted, (none but sprouted ones), in a deep furrow and covered at first with about two inches of soil, afterwards filling in the furrow as growth advances.

RESULTS OF FALL CROP UNDER FERTILIZERS.

Kind and Quantity.	Yield Per Acre, in Bushels.		
	Salable.	Culls.	Total.
1000 pounds cotton seed meal	87.12	16.94	104.06
300 pounds acid phosphate	101.64	16.99	118.63
100 pounds muriate of potash	67.76	9.68	77.44
No manure	75.02	6.05	81.07
1000 pounds cotton seed meal, 300 pounds acid phosphate, 100 pounds muriate of potash	87.12	4.84	91.96

The above results indicate, as did the spring results, a need of nitrogen (cotton seed meal) and phosphoric acid (acid phosphate) but no potash.

The fall crop was dug December 2.

EXPERIMENT NO. 1.—SWEET POTATOES—TEST OF VARIETIES.

No. of Exp't.	Varieties.	Yield.			Growth.
		Salable.	Small.	Total.	
1	Barbado	457.19	19.19	476.38	8
2	Bermuda	237.32	20.94	258.26	8
3	Big Stem Jersey	335.04	29.66	364.70	10
4	Delaware	111.68	22.68	134.36	5
5	Dog River	209.40	61.07	270.47.	6
6	Early Golden	322.66	20.16	342.82	8
7	Georgia	233.83	17.45	251.28	8
8	Gold Skin	97.72	19.19	116.91	6
9	Hayman	635.18	13.96	649.14	10
10	New Jersey	174.50	26.17	200.67	6
11	Norton	537.46	19.19	556.65	9
12	Pumpkin	272.22	8.72	280.94	8
13	Peabody	544.44	10.68	555.12	7
14	Red Nansemond	600.28	19.19	619.47	10
15	Shanghai or California	523.50	16.57	539.07	9
16	Spanish Yam	375.17	8.72	383.89	8
17	Sugar	237.32	32.27	269.59	7
18	Southern Queen	460.68	19.19	479.87	10
19	Vineless	268.73	31.41	300.14	9
20	Yellow Nansemond	43.62	17.45	60.07	5
21	Matejito	169.40	24.20	193.60	8
22	Canal	231.92	10.08	242.00	8
23	Ticotea	257.12	45.37	302.49	10

SWEET POTATOES—TEST OF VARIETIES.

Experiment No. 1—The above varieties may be divided into two classes, according to the shape of the leaf. The cut leaf varieties—and these are considered the best for table use—are Sugar, Georgia, Spanish, Barbado and Vineless, while all the rest have leaves entire or nearly so. Of the table varieties the Sugar is most desirable, yet it is less productive than the Georgia, which is a very desirable table variety and does well on nearly all classes of soils. Of the second class the Hayman heads the list, giving a yield of 635.18 bushels per acre. This calculation being made upon 60 pounds per bushel, while as large a variety as this, is by most seedmen, calculated at 50 pounds per bushel. All of the results upon sweet potatoes have been calculated upon a basis of 60 pounds per bushel.

In our last year's results we were unable to report a fair trial of the Vineless, but it has been well tested this year, and has proven itself to be a very fine potato. It was planted at the

same distance as the other varieties in our tests, but the rows may be very easily placed one foot closer than those of any other variety. It grows in a bunch form and may during very dry seasons, and on (*weedy?*) soils, may be cultivated much later in the season.

EXPERIMENT NO. 2—SWEET POTATOES—FERTILIZER EXPERIMENTS.

No. of Expt.	Kind and Quantity of Manure Per Acre.	Yield Per Acre, in Bushels.		
		Salable.	Small.	Total.
1	466 2-3 pounds nitrate of soda	282.72	13.96	296.68
2	100 pounds sulphate of potash	268.75	5.23	273.98
3	300 pounds acid phosphate	251.28	13.95	265.23
4	No manure	251.25	6.98	258.23
5	466 2-3 pounds nitrate of soda 300 pounds acid phoaphate	223.30	13.96	237.32
6	300 pounds acid phosphate 100 pounds sulphate of potash	254.77	8.72	263.49
7	466 2-3 pounds nitrate of soda 100 pounds sulphate of potash	212.89	10.47	223.36
8	No manure	247.79	6.98	254.77
9	1000 pounds cotton seed meal	237.32	10.47	247.79
10	1000 pounds cotton seed meal 300 pounds acid phosphate	240.81	10.47	251.28
11	1000 pounds cotton seed meal 100 pounds sulphate of potash	209.40	13.95	223.35
12	1000 pounds cotton seed meal 300 pounds acid phosphate 100 pounds sulphate of potash	195.44	20.94	216.38
13	466 2-3 pounds nitrate of soda 300 pounds acid phosphate 100 pounds sulphate of potash	181.48	17.45	198.93

In all the experiments following the test of varieties the variety Georgia was taken. From the above results little can be ascertained as to the fertilizer best suited for sweet potatoes. Last year was an exceptionally wet one and very favorable to the production of vines; so much so, that on very rich soils all vines were produced and no tubers.

From the difference of the appearance of the vines of the nitrogen (nitrate of soda and cotton seed meal) fertilized plot we might judge of the effects; in every case the vines were more vigorous, which, under the conditions of the season may have decreased the amount of tuber formation. In a dry season we feel that the results would be more apparent upon this soil.

EXPERIMENT NO. 3—HEIGHT OF RIDGE.

No. of Expt.	Height of Ridge.	Yield.		
		Salable.	Small.	Total.
1	In trench with pine straw, buried	160.54	8.72	169.26
2	On the level	153.56	17.45	171.01
3	On ridge, four inches high	143.09	13.96	157.05
4	On ridge, eight inches high	171.01	13.96	184.97
5	On ridge, twelve inches high	212 89	12.21	225.10
6	On ridge, sixteen inches high	219.87	15.70	235.57
7	On ridge, twenty inches high	331.55	10.47	342.02

The sweet potato evidently wants little resistance to its growth and the height of the ridge apparently determines the amount of the product. This fondness for freedom of growth is even shown in the advance of yield of the tubers grown in the trench over those grown on the level, and is more plainly shown by the yields as indicated by the increasing height of the ridge.

EXPERIMENT NO. 4—DISTANCE OF SLIPS IN THE ROW.

No. of Expt.	Distance.	Yield.		
		Salable.	Small.	Total.
1	Eight inches	328.06	10.47	338.53
2	Twelve inches	247.79	10.47	258.26
3	Fifteen inches	279.20	6.98	286.18
4	Eighteen inches	215.38	10.47	226.85
5	Slips in pairs, eight inches	321.08	13.96	335.04
6	Slips in pairs, twelve inches	349.00	10.47	359.47
7	Slips in pairs, fifteen inches	279.20	10.47	289.67
8	Slips in pairs, eighteen inches	272.22	10.47	282.69
9	Vines all along the row, tips out every fifteen inches	237.32	6.98	244.30

According to the results of last season, the distance of 15 inches in the row gave the greatest yield. The above indicate results similar to those previously obtained, and the distance of 15 inches can be relied upon as best, while the fluctuations of the 8 inch distance indicate uncertainties.

The placing of 2 vines every 15 inches gave the same number of salable tubers and more culls. This result might be different during a dry season.

EXPERIMENT NO. 5.—LENGTH OF SLIPS.

No. of Exp't.	Length of Slips.	Yield.		
		Salable.	Small.	Total.
1	Four inches long	167.52	15.70	183.22
2	Eight inches long	153.56	20.94	174.50
3	Twelve inches long	167.52	13.96	181.48
4	Sixteen inches long	240.81	15.70	256.51
5	Twenty inches long	209.40	19.19	228.59
6	Twenty-four inches long	307.12	10.47	317.59
7	Whole vines laid in the row—covered every fifteen inches	181.48	17.45	198.93
8	Whole vines laid in the row—all covered but leaves	216.38	13.96	230.34

The great difference in the length of vines used by growers called forth the above experiment, and it will be seen that vines 24 inches long give the best result. A length from 16 to 24 inches is more desirable than from 4 to 12 inches.

EXPERIMENT NO. 6.—SLIPS TAKEN FROM DIFFERENT PORTIONS OF THE VINE.

No. of Exp't.	Source of Slip.	Yield.		
		Salable.	Small.	Total.
1	From the terminal end of vine	307.12	13.96	321.08
2	From the centre of the vine	261.75	6.98	268.73
3	From the butt end of the vine	184.97	13.96	198.93

The promiscuous selection of any part of the vines together with varying results from plants along the same row induced us to make a trial as to the most productive part of the vine, terminal, middle or butt, taking 24 inches of each. The above results, while apparently very conclusive, must be taken as that of a single test.

EXPERIMENT NO. 7—PINCHING.

Treatment.	Yield		
	Salable	Small.	Total.
Vines pinched weekly to a length of 2 feet	188.46	13.96	202.42
Vines cut to length of 2 feet September 15	195.44	20.94	216.38
" " " " " 2 " October 15	181.48	10.47	191.95
Vines under ordinary treatment	250.34	6.48	256.82

Last season was an excellent one to test the above, as, if anything, the vines were too vigorous, and the pinching or cutting might tend to direct the growth to the tuber. From the above we would conclude that, under ordinary conditions of soil, etc., the practice of cutting the vines before the tubers are matured is not a profitable one, except that the vines are of more value (for food for stock) at this season of the year than the increased yield of tubers would be.

EXPERIMENT NO. 8.

No. of Expt.	Treatment.	Yield		
		Salable.	Small.	Total.
1	Vines left undisturbed in every way	352.49	76.78	429.27
2	Vines not allowed to become attached at any point	226.85	20.94	247.79

The above is quite contrary to the results gotten last season in many other parts of the State. At the Sugar Experiment Station, New Orleans, La., the vines were allowed freedom, and very few potatoes were produced. This was largely due to the rich soil and the wet season causing a great growth of vines, which took root at every joint. On poorer classes of soils and those better suited for sweet potato production the natural tendency of the vine was maintained—that of forming tubers only at the base of the vine and the yield was increased. Should the above result prove by future experiments to be correct, the practice of leaving the vines undisturbed could only be followed on very clean soil.

RADISHES—VARIETIES.

Varieties.	Marketable.	Growth	Characteristics and Remarks.
Black Spanish (Winter).....	May 6.	8	Blackish, turnip shaped; very solid.
California Mammoth (Winter)	May 27.	10	Large and white; very large roots, does not sell well.
Chinese Rose (Winter).....	April 30.	10	Large, rose color; very beautiful in appearance.
Charter.....	March 24.	10	Red top, long, light tip; root tapering, handsome and popular.
Early Scarlet Globe.....	March 18.	8	Round, dark red; medium size.
El Dorado or Yellow Ball....	March 24	10	Round, yellow; very solid and brittle.
Early Long Scarlet	March 30.	8	Dark red and long; best early, long radish.
Earliest Carmine	March 15.	6	Small, red, round; very early, grows well.
French Breakfast.....	March 18.	7	Dark red and sausage-shaped; one of the best early radishes.
Giant White Stutgart.....	April 1.	10	Half long, pure white.
Large White Vienna.....	April 14.	10	Long and white; very long with enormous roots.
New Radish, No. 23 (Burpee	April 4.	8	Dark straw color, beet-shaped; good, gets stringy soon.
New White Strasburg.....	March 24.	10	White, long and beautiful; sold very readily.
New Chinese Mammoth.....	April 15.	8	Large and white; medium long, makes attractive bunches.
New Celestial.....	April 27.	9	Long and white; slender growth.
Olive-shaped Deep Scarlet...	March 20.	5	Scarlet, oblong; did not do well.
Philadelphia White Box.....	April 10.	9	Snow white, turnip-shaped; medium size, beautiful.
Rosy Gem.....	March 24.	8	Round, deep rose to pink; medium size, beautiful.
Round Dark Red	March 24	8	Deep red, round; sold well.
Surprise	March 20.	8	Cream white, half long; very solid flesh.
Scarlet Button.....	March 20.	7	Small, round, carmine; very early and small.
White Strasburg.....	March 31.	10	White, very large tops; roots not large and clear.
White Tipped Scarlet Turnip	March 31.	10	Root scarlet, with white tip; flat and round, somewhat coarse.

Seed was sown January 30 and at intervals of three weeks until July.

RECOMMENDATIONS.

For earliest sowing in January and February, Earliest Carmine, Scarlet Button, Rosy Gem and French Breakfast. For March and April, Early Long Scarlet, Charter, Rosy Gem and Scarlet Button.

RUTABAGAS.

	Varieties.	Yield Per 10 Feet.
1	Burpee's Breadstone	10 5-8 lbs.
2	Carter's Imperial	20 lbs.
3	Improved American Purple Top	7 3-8 lbs.
4	White Russian " "	10 1-2 lbs.
5	White Havana	25 lbs

These were sown at the same time as the turnips. The best early varieties are the Breadstone and White Russian. The White Havana sown in the latter part of August afforded roots from November until February. They sold very readily at this season. Commonly they are sown broadcast, but the best roots were obtained by sowing in drills and cultivating thoroughly.

SQUASHES.

Varieties.	When Sown.	First Fruit.	Whole No. of Fruits.
American Turban	April 6.	July 11	21
Cushaw Livingston	" "	" 15	13
Coecozelle	" "	June 4	10
Early Bush	" "	June 3	34
Essex Hybrid	" "	" 10	14
Golden Custard	" "	" 8	29
Giant Summer Crookneck	" "	" 7	10
Golden Summer Crookneck	" "	" 24	13
Hubbard	" "	" 30	14
Long White Bush Vegetable Marrow	" "	" 5	8
Pincushion	" "	July 10	20
Perfect Gem	" "	" 24	24
White Bush Scalloped	" "	June 4	19
White Pine Apple	" "	" 10	32
Yellow Bush	" "	" 6	25

Of these varieties the earliest, most prolific and most popular is the Early Bush, followed closely by the Yellow Bush, but is always preferred on account of its color.

The seed of the Pincushion squash were sent to the Station from Livingston parish. It is a decided novelty—a turban with an extreme enlargement of the pistil. The body being a bright copper red and the enlargement green striped with dark green, hence its name.

The Livingston Cushaw is very sweet and for later use is one of the best.

RECORD OF SPRING TOMATOES.

Varieties	Time of Setting.	Treatment.	First Picking.	Last Picking.	Yield.
Acme	Mar. 31	From cold frame	June 3	July 14.	26 lbs. 7 oz.
Advance	" 31	" pots	May 28	" 18	44 " 3 "
Advance	" 31	" trench	June 6	" 19	43 " 7 "
Alpha	" 31	" cold frame	" 13	" 14	27 " 15 "
Amber Gem	" 31	" " "	" 16	" 19	22 " 8 "
Atlantic Prize	" 31	" " "	" 16	" 12	19 " 12 "
Beauty	" 31	" " "	" 13	" 14	26 " 6 "
Belle	" 31	" pots	" 9	" 7	43 " 6 "
Belle	" 31	" trench	" 16	" 7	26 " 2 "
Brandywine	" 31	" cold frame	" 16	" 18	31 " 11 "
Chemin	" 31	" " "	" 13	" 18	33 " 7 "
Cherry	" 31	" pots	" 6	" 18	25 " 8 "
Cherry	" 31	" trench	" 6	" 19	35 " 5 "
Cincinnati Purple	" 31	" frame	" 3	" 18	35 " 2 "
Conqueror	" 31	" pots	" 6	" 12	35 " 13 "
Conqueror	" 31	" trench	" 6	" 18	46 " 10 "
Dwarf Champion	" 31	" frame	" 11	" 18	19 " 6 "
Golden Queen	" 31	" "	" 10	" 18	22 " 6 "
Haines, No. 64	" 31	" pots	" 9	" 5	28 " 5 "
Haines, No. 64	" 31	" trench	" 3	" 12	27 " 9 "
Hoovey	" 31	" frame	" 10	" 18	35 " 2 "
Ignotum	" 31	" "	" 6	" 14	19 " 11 "
King Humbert	" 31	" pots	" 9	" 18	36 " 3 "
King Humbert	" 31	" trench	" 6	" 18	33 " 13 "
Little Gem	" 31	" frame	" 3	" 4	10 "
Lorrillard	" 31	" "	" 10	" 14	27 " 13 "
Market Garden	" 31	" pots	" 16	" 18	29 " 5 "
Market Garden	" 31	" trench	" 21	" 12	17 " 8 "
Matchless	" 31	" frame	" 11	" 18	34 " 13 "
Mayflower	" 31	" pots	" 9	" 7	32 " 1 "
Mayflower	" 31	" trench	" 9	" 12	32 " 2 "
McCuhum's Hybrid	" 31	" frame	" 13	" 12	24 " 5 "
Mikado	" 31	" pots	" 9	" 12	44 " 13 "
Mikado	" 31	" trench	" 16	" 12	28 " 9 "
New Jersey	" 31	" pots	" 10	" 7	37 " 1 "
New Jersey	" 31	" trench	" 6	" 18	24 " 6 "
Peach	" 31	" frame	" 13	" 14	21 " 15 "
Pear-Shaped	" 31	" "	" 6	" 18	38 " 13 "
Perfection	" 31	" "	" 23	" 16	16 " 3 "
Potato Leaf	" 31	" "	" 10	" 5	30 " 3 "
Prelude	" 31	" "	" 3	" 18	35 " 4 "
President Cleveland	" 31	" pots	" 6	" 18	41 " 8 "
President Cleveland	" 31	" trench	" 6	" 18	33 " 10 "
Puritan	" 31	" pots	" 9	" 7	36 " 14 "
Puritan	" 31	" trench	" 13	" 7	34 " 2 "
Seoville's Hybrid	" 31	" frame	" 13	" 14	21 " 3 "
Shah	" 31	" "	" 16	" 13	27 " 5 "
Stone	" 31	" "	" 16	" 18	36 " 7 "
Table Queen	" 31	" "	" 3	" 18	27 " 15 "
Tilden	" 31	" "	" 6	" 12	23 " 7 "
Volunteer	" 31	" "	" 13	" 14	33 " 10 "

FALL TOMATOES.

Varieties.	Time of Setting.	Treatment.	First Picking.	Last Picking.	Amount Left After First Killing Frost.	Yield.
Acme	Aug. 2	From pots	Oct. 20	Dec. 8		12 lbs 8 oz
"	"	" trench	"	Dec. 8		11 lbs 3 oz
Advance	"	" pots	Oct. 15	Dec. 5	8 oz.	14 lbs 11 oz
"	"	" trench	Oct. 24	"	14 oz.	9 lbs 14 oz
Beauty	"	" pots	Oct 18	"	8 oz.	18 lbs 10 oz
"	"	" trench	Oct. 20	"		7 lbs 3 oz
Cardinal	"	" pots	Oct. 27	"		6 lbs 3 oz
"	"	" trench	Oct. 20	"	9 oz.	5 lbs 10 oz
Chemm	"	" pots	"	"	7 oz.	13 lbs 1 oz
"	"	" trench	Nov. 18	"	9 oz.	6 lbs 2 oz
Cherry	"	" pots	Oct. 20	"	2 lbs.	25 lbs.
"	"	" trench	"	"	2 lbs 9 oz.	19 lbs 15 oz
Climax	"	" pots	Oct. 19	"		24 lbs 5 oz
"	"	" trench	Oct. 20	"	8 oz.	15 lbs 10 oz
Dwarf Champion	"	" pots	Oct. 27	Nov. 30		9 lbs 3 oz
"	"	" trench	Oct. 20	Dec. 8		7 lbs 9 oz
Essex Early Hybrid	"	" pots	"	"	7 oz.	22 lbs 5 oz
" " "	"	" trench	"	"	1 lb 2 oz.	14 lbs.
Early Optimus	"	" pots	"	"		7 lbs 5 oz
" "	"	" trench	"	"		7 lbs 13 oz
Favorite	"	" pots	Oct. 27	"		10 lbs 10 oz
"	"	" trench	Oct. 31	"		8 lbs 10 oz
Golden Trophy	"	" pots	Oct. 20	"	3 oz.	19 lbs 12 oz
" "	"	" trench	"	"	15 oz.	17 lbs 4 oz
Golden Queen	"	" pots	Oct. 24	"	7 oz.	19 lbs 1 oz
" "	"	" trench	Oct. 20	"	2 lbs 14 oz.	25 lbs.
Ignotum	"	" pots	Oct. 27	"		11 lbs 8 oz
"	"	" trench	Oct. 31	Nov. 30		17 lbs 4 oz
Longkeeper	"	" pots	Oct. 20	Dec. 8		6 lb 7 oz
" *	"	" trench				
Lorrillard	"	" pots	Oct. 20	Dec. 8		27 lbs 6 oz
" *	"	" trench				
Matchless	"	" pots	Oct. 20	Dec. 8		3 lbs 2 oz
"	"	" trench	"	"		8 lbs 5 oz
Paragon	"	" pots	"	"	10 oz.	9 lbs 14 oz
"	"	" trench	"	"	10 oz.	15 lbs 1 oz
Peach	"	" pots	"	"	9 oz.	10 lbs 6 oz
"	"	" trench	"	"	1 lb	11 lbs.
Perfection	"	" pots	Oct. 18	"	9 oz.	16 lbs 15 oz
"	"	" trench	Oct. 20	"		7 lbs 6 oz
Ponderoso	"	" pots	Nov 12	Nov. 30		3 lbs 5 oz
"	"	" trench	Nov. 30	"		1 lbs 4 oz
Potato Leaf	"	" pots	Oct 20	"		5 lbs 1 oz
" "	"	" trench	"	Dec. 8		8 lbs 9 oz
Red Pear Shaped	"	" pots	Oct. 27	"	1 lb 2 oz.	12 lbs 8 oz
" "	"	" trench	"	"	2 lbs 3 oz.	8 lbs 11 oz
Scovill's Hybrid	"	" pots	Oct. 20	"		6 lbs
" "	"	" trench	Oct. 24	"		9 lbs 14 oz
Small Round Yellow	"	" pots	"	"	2 lbs 8 oz	16 lbs 5 oz
" " "	"	" trench	"	"	3 lbs 4 oz	16 lbs 12 oz
Stone	"	" pots	"	"	8 oz.	16 lbs 9 oz
"	"	" trench	Oct. 27	"	1 lb 1 oz.	11 lbs 5 oz
Tree*	"	" pots				
" *	"	" trench				
Trophy	"	" pots	Oct. 27	Dec. 8	12 oz	10 lbs 8 oz
"	"	" trench	Oct. 31	"	1 lb	8 lbs 12 oz

*Failure.

FALL TOMATOES—CONTINUED.

Varieties.	Time of Setting.	Treatment.	First Picking.	Last Picking.	Amount left after first killing frost.	Yield.
Turner's Hybrid...	Aug. 2	From pots.	Oct. 20.	Dec. 8	.....	.....
Turner's Hybrid...	Aug. 2	From trench	Oct. 24.	Dec. 8	....	8 lbs. 5 oz.
Volunteer.....	Aug. 2	From pots.	Oct. 18.	Dec. 8	.....	31 lbs. 7 oz.
Volunteer	Aug. 2	From trench	Oct. 24.	Dec. 8	.....	15 lbs. 8 oz.
Waite Apple.....	Aug. 2	From pots.	Oct. 24.	Dec. 8	15 oz.	9 lbs. 8 oz.
White Apple.....	Aug. 2	From trench	Oct. 31.	Dec. 8	1 lb. 9 oz.	8 lbs. 9 oz.

The records from spring and fall tomatoes show a test of productiveness of each variety and show, too, that the confining of the roots in small pots has a tendency to increase the production and to hasten the ripening. The potted plants stand transplanting much better and hence give a more successful stand than those t ansplanted in beds or trenches.

TOMATO EXPERIMENT—FERTILIZERS.

Variety used was Perfection, 6 plants per experiment, set 3x4.

No. of Experiment	Kind and Quantity Per Acre.	First Fruits.	Last Picking.	Yield.
1	1000 pounds cotton seed meal.....	June 27	July 19	16 lbs 11 oz
2	300 po unds acid phosphate.....	" 16	" 20	30 lbs 12 oz
3	100 sulphate of potash.....	" 16	" 19	19 lbs ... .
4	No manure.....	" 23	" 16	16 lbs 3 oz
5	1000 pounds cotton seed meal..... 300 pounds acid phosphate.....	" 13	" 18	26 lbs 6 oz
6	1000 pounds cotton seed meal..... 100 pounds sulphate of potash.....	" 14	" 20	13 lbs 6 oz
7	300 pounds acid phosphate..... 100 pounds sulphate of potash.....	" 18	" 21	19 lbs 3 oz
8	1000 pounds cotton seed meal 300 pounds acid phosphate 100 pounds sulphate potash (In one application.)	" 14	" 19	25 lbs 13 oz
9	1000 pounds cotton seed meal 300 pounds acid phosphate 100 poundss sulphate potash (In three applications.)	" 18	" 14	35 lbs 2 oz

The effect of phosphoric acid stands out quite prominently, as in every instance the yield was increased by its application. The combined fertilizer gave a decided increase when applied at different times over that of a single application at the time of planting.

TOMATO EXPERIMENTS—TRAINING EXPERIMENTS.

The variety used in the following was Perfection, set 4 feet in row.

No. of Exp't.	Treatment.	First Picking.	Last Picking.	Yield.	
1	Single stakes	June 2.	July 20.	17 lbs. 14 oz.	6 plants per each.
2	On rests	June 16.	July 19.	30 lbs. 3 oz.	
3	Wire netting	June 14.	July 14.	20 lbs. 1 oz.	
4	Hilled (without trellis)	June 10.	July 19.	27 lbs. 11 oz.	
5	Level (without trellis)	June 23.	July 16.	16 lbs. 3 oz.	

The single stem system hastened ripening very considerable, but the vines which were allowed to fall upon rests (one on each side of the row, 1½ feet high) gave much the greatest yield. The hilling of the plants giving them support is not without its benefit.

TURNIPS—VARIETIES.

Varieties.	Seed Sown.	Harvested.	Weight in Pounds, Per 10 Feet.
Amber Globe	Jan. 30	April 30	14
Early White Flat Dutch	"	" 20	11 11-16
Early Round or Purple Top	"	" 22	10 15 16
Early White Egg	"	" 22	8 1-2
Early Cow Horn	"	" 22	14 1-2
Extra Early Red Top Milan	"	" 23	8 3-8
Golden Ball	"	May 1	13 15-16
Large Purple Top	"	April 23	7 3-4
Munich Extra Early Purple Top	"	" 22	12
Pomerian White Globe	"	" 29	12 1-8
Seven Top	"	" 30	13 3-4
Yellow Aberdeen	"	" 23	12

Sowings were made on January 30, and February 28, also in August and September. The early flat varieties were the

most popular in the market, the Early White Flat Dutch taking the lead. The deeper rooted varieties made the best growth in the February sowing. The Red Top Milan doing the best.

The market gardeners around Baton Rouge use the White Flat Dutch mostly and sow a small plot broadcast. If allowed to get much over 2 inches in diameter they rapidly become stringy ; hence, they are pulled and sold when very young, tender and succulent. The White Egg is a solid variety, sweet and crisp.

SECHIUM EDULE (SWARTZ).

This plant, known in Louisiana as the "vegetable pear," in the Isthmus of Panama as "*cayote*," in Brazil as "*chuchu*," and in Jamaica as "*chocho*," is a perennial belonging to the family cucubitaceæ, and has been grown (but little) in this State for over twenty years.

There is a great deal of dispute regarding the nativity of this plant, but De Candolle ("Origin of Cultivated Plants") states : "The plant is probably a native of Mexico and Central America, being introduced into the West Indies and to Brazil in the eighteenth century."

Accounts, with figures of this fruit have been published by the "Rural New Yorker," April 8, 1891, and by the "Rural Pacific Press," April 4, 1891. Mr. Wickson, in his work on "California Fruits and How to Grow Them," has spoken of this fruit as "a very prolific bearer. Both the fruit and yam-like tuber are used as food for man and beast in the West Indies, where it is considered a wholesome article of diet."

We have used the fruit cooked much like other cucurbits and regard it quite palatable and worthy of a more extensive cultivation. The fruits become ready for use about the first of November, and may be stored away in barrels in a cool place, where they will keep well all winter.

The following is a record of the production of two plants last season :

Whole crop, 347 fruits. Whole weight, 232 pounds. Average weight, 15.02 ounces.

For analyses of this plant, see chemical report of this Bulletin.

Respectfully submitted,

H. A. MORGAN,
F. H. BURNETTE.

REPORT OF THE BOTANIST.

BATON ROUGE, LA., March 14, 1893.

Dr. Wm. C. Stubbs, Director:

SIR—The experiments with forage plants, inaugurated by this department for the season of 1891–92, did not result satisfactorily in the large majority of cases, partly because the planting was too late, but principally on account of the prolonged and unremitting rains which we had last spring and summer. These brought forth such a growth of native grasses and weeds as to utterly choke out all seeds that were sown in the early spring. Even many of the plants which we got up from our fall sowing succumbed to the encroachments of this vigorous crop of noxious natives. The area assigned to the Botanical Department for its operations is unfortunately afflicted to an extent, unusual even in this section, with that bane of farming operations, cocoa (Cyperus rotundus). This is with us at all times and in all seasons, the most ineradicable pest against which we have to contend. Other pests which are especially troublesome in the early spring are chickweed (Stellaria media) Carolina Cranesbill (Geranium Carolinianum). Dead nettle (Lanium amplexicaule) and Peppergrass (Senebiera pinnatifida). To enumerate all the weeds which made their appearance and thrived in our garden during this, for them, unusually propitious season would be to give a catalogue of the principal noxious plants of this section, and probably of the State. This Department hopes to publish at some time in the future such information relating to these enemies of farming operations as will be useful in their identification and eradication. One hundred and four kinds of grasses and forage plants were planted during the season. Of this number only the following

withstood the unfavorable conditions mentioned above: Texas Blue grass (Poa arachuifera), Bermuda grass (Cynodon dactylon), Crab grass (Panicum sanguinale), Alfalfa (Medicago sativa), Spotted mediek (Medicago mucalata), Crimson clover (Trifolium incarnatum), White clover (Trifolium repens).

It will thus be seen that, with a few exceptions, only those plants which grow luxuriantly here without assistance, thrived under the circumstances. But these together give a series of forage plants for quite the entire year. For winter and early spring Texas Blue grass and the clovers seem to fulfill all the requirements, followed in summer by Bermuda and Crab grass, the two best grasses we have. It was impossible during the wet summer to restriet the last two to the plots allotted to them, but together they covered the whole area of the garden, yielding several heavy cuttings of hay for our work animals. The failure of the other plants tried under last year's conditions is by no means indicative of worthlessness in every case. On the contrary many of them which were replanted last fall now give promise of much value. It may be of interest to give an outline of the plan pursued by this Department, together with a preliminary report of the work of the current year. The grounds on which our operations are conducted have been divided into about 1400 plots 8 feet square. These are divided into two parts by a central road running east and west. To the north of this road are about 600 plots reserved for grasses exclusively. These plots will be planted in botanical order, and thus serve a double purpose—that of experimentation and instruction by furnishing material scientifically arranged for the practical study of the order Gramineæ. At present 157 of these plots are planted. We expect to increase this number to 200 before the season ends.

In due time the results obtained with these grasses will be published. Of course, as the number increases many will be represented of purely botanical or ornamental value. To the south of the central road above alluded to are the remaining plots of the Botanical Garden. These are reserved for flowering plants other than grasses. These too are grouped botanically, so

that each natural order of plants, which can be represented here, will have its quota of genera and species. Two hundred and forty of these plots have been planted up to the present time, which number will be increased continuously. In a report of a general nature, such as this one, a detailed account of these plants would be out of place. Suffice it to say that they represent forage, medicinal and ornamental plants; also those which are valuable for their fiber as well as our principal vegetabels. Of the medicinal plants we represent as far as possible those which are valuable as the sources from which the medicines used in the practice of veternary surgery are obtained, in order that material may be at hand for practically obtaining a knowledge of their characters. The whole area occupied by these 1400 plots is bounded on all sides by broad roads between which and the enclosure is a strip about 30 feet wide running rectangularly aronnd the garden. This strip will be occupied by our different trees, some of which have been grown from the seed during the present season. This brief description will give an adequate notion of the purposes of the Department, and of its possibilities for good. The plan adopted is an extensive one whose accomplishment involves many difficulties and a considerable annual expenditure. But its perfection will provide an unfailing source of instruction both from an educational and experimental standpoint. In view of these facts the writer is encouraged to believe that the College authorities will eventually supplement the liberal efforts of the Station to build up this Department, and thus assure the success of the undertaking. The Botanist has during the past season answered a number of inquiries concerning plants sent for determination, and is ready and willing to carry on a similar work in the future. He invites all concerned to call upon him whenever his services are needed.

Very respectfully,

A. T. PRESCOTT,

Botanist.

REPORT OF THE VETERINARIAN.

Dr. W. C. Stubbs, Director:

Dear Sir—I hand you herewith report of the Veterinary Department to the end of February, 1893.

The appreciation of this department by the agricultural and stock owning public of the State generally, has not, by any means lessened, but rather increased during the past twelve months, as evidenced by the daily inquiries, through the mails from all sections, with reference to animal ailments; by the daily attendance of suffering stock at our free clinique and by the frequent requests from the parishes, through their Police Juries for our presence and assistance in investigating, controling and exterminating some disease or other of a Enzootic or Epizootic character.

ACUTE NEPHRITIS IN MULES.

In March, 1892, we were desired to visit Speranza plantation, St. Charles parish, to locate, if possible, the cause of a "serious trouble amongst the mules," sixteen of which had been attacked, all presenting similar symptoms, and five had died previous to our being notified. The symptoms were those of acute kidney disorder, and suspicion rested with either the food or water, or both. One of the victims was still uninterred which gave an opportunity for an autopsy. On removal of the kidneys, each weighed about 6 pounds and on section there was found scattered over the cut surfaces small points of suppuration, (purulent abscesses). After thorough investigation and careful inquiry it was discovered the mules had been feeding, for a period of two months or more, on very badly moulded pea vine hay. The drinking water was from a shallow well situated close to the sugar house which at times became somewhat surcharged with organic mattter.

The affcted animals were at once ordered an entire change of food (mashes of boiled flaxseed and wheat bran) and as medicinal treatment,

Iodine	20 grains.
Potassium Iodide	1 drachm.
Sulphate of Iron	1 drachm.
Water	1 pint.

was made into a drench and given to each animal twice daily. No further fatalities occurred. On April 20th we received a letter from the owner to the effect that the mules were working half time and were expected to be doing full work in ten days more. Since that time they have continued in perfect health.

The following analyses by Prof. B. B. Ross, Chemist, show the condition of the well water and peavine hay referred to above :

WELL WATER.

Total solid matter	44.9 grains per gallon.
Organic and volatile matter	14.05 grains per gallon.

Calcium, Magnesium, Iron (trace), Potassium, Sodium, Chlorine, Sulphuric Acid, Phosphoric Acid, Carbonic Acid.

PEAVINE HAY.

Fungus containing mineral matter. Phosphates and Sulphates of Calcium, Potassium and Sodium.

A small portion of the hay in a sugar solution produced Butyric fermentation.

PARAPLEGIA IN MULES.

Paralysis of the hind extremities, due to almost constant pressure (while at work) of plow backbands over the loins (lumbar region of spinal column).

On the 18th of July last we received a letter from the owner of the Ellington Planting Company, Limited, in St. Charles parish, with reference to a "peculiar disease affecting the mules, apparently affecting the kidneys." From the previous January, up to the date of the letter, "ten to twelve mules had succumbed." The symptoms given were, "Weakness in the back, just over the kidneys and a trembling of the hind legs and quarters. Mules eat splendidly till they fall down to die,"

This being the neighboring plantation to the one previously referred to, the owner at once suspected that the condition might be due to a similar cause, and sent a sample of the drinking water for analysis, but although it contained organic matter in rather large quantity, it was scarcely thought sufficient in itself to bring about such fatal results in the time. The food, both hay and grain, had been carefully examined and considered beyond suspicion. On August 4, we visited the plantation, by request. There were no animals suffering at the time and we were therefore deprived of seeing the exact nature of the trouble. Being somewhat suspicious, however, of undue pressure of some description over the region of the loins we determined to see the mules at work in the plow, and there, in several instances, were the backbands hanging right over the loins, almost as far back as the points of the hips, causing the animals to have to bear almost the entire weight and traction of the plow over that part of the back which has the least support.

The situation of the backband we suggested as being the most probable cause, (having had previous experience of a similar condition), and that careful watchfulness as to the gearing would no doubt result favorably.

Since that time, with the exception of one animal, we have not heard of any further trouble from that cause.

ECZEMA IN MULES.

In July a levee contractor who had camped on a pasture about a mile from the city of Baton Rouge desired our opinion of a skin disease from which all of his mules (56 in number) were suffering. He was afraid it was of a contagious character, hence his request for our services. The disease proved to be an Eczematous inflammation of the skin. The animals had received a sudden change of feed, which no doubt was the primary cause, but being in the height of summer, they were kept in great uneasiness on account of the hot weather, and insects, such as flies, mosquitos, etc., producing extreme irritation, and causing them to rub and bite themselves incessantly until they presented a very sorry spectacle. In some of the worst cases the

disease had gone on to the formation of pustules the discharge from which produced a very offensive odor.

The treatment consisted in cooling and laxative diet and alterative medicine (Potas Nitrate and Sulphur) internally. As an external application a wash composed of a one per cent. solution of Cresyl-Jeyes' and fluid astringent and disinfectant fluid was used, and in a week or two, after recovering their lost condition, the mules were ready again for work.

GLANDERS.

The President of the Police Jury of Iberville parish wrote on December 13, requesting us to come to Plaquemine to examine a horse suspected of glanders. On examination we found that such was the case. The affected animal was destroyed. Other animals that had been in contact were isolated and all the other necessary precautions as to disinfection of premises, etc., were taken to prevent any further spread. On the 22d another letter from the same source as the last, desiring our assistance in deciding a suspicious case at White Castle, Iberville parish. The result being another undoubted case. These two animals were out of a drove of horses said to be from Oregon, but came by way of New Orleans, where they remained for a short time *en passant*. We have reason to believe there was no further spread of the disease from either of these points.

On February 22, an official communication was received from the President of the Police Jury of Morehouse parish, embodying the request that we "come to said parish to examine stock supposed to have glanders, report to the Police Jury and give such advice as we might deem proper in the premises." After going through the parish we found that the disease existed in three, and had existed within a few months, in five wards. We made a report to the Police Sury at their meeting, and suggested sanitary and other measures for its extermination, which they decided to stringently enforce.

While at Bastrop, in Morehouse parish, we received a request from the Police Jury of Ouachita parish to visit Monroe and the neighborhood for the purpose of making some investi-

gations into the disease there. After making visits to several portions of the parish, we found that glanders existed in Ouachita parish also. We had a meeting with representatives of both the Police Jury and City Council at which we reported the results of our investigation and recommended methods by which if rigidly carried out, the disease could be held in control and ultimately eradicated.

On our return to Baton Rouge we were asked to stop off at Alexandria to examine some mules belonging to a planter in Rapides parish, of which he felt somewhat suspicious. However, we did not find the disease in this case.

We have every reason to believe that with watchfulness and stringency the disease will be stamped out in each of the outbreaks referred to, *but* just how long a parish or section of the State will remain free, is a question which is very difficult to answer. So long as we remain without laws to control this and kindred diseases by proibiting their being imported into our State we can never expect to show a clean bill of health.

We have no hesitation in stating that glanders is imported, because we have proved such to be the case in all the outbreaks to which our assistance has been asked.

Since the first outbreak to which our attention was called we have never lost an opportunity both through the publications of the Agricultural Bureau and the columns of the public press of endeavoring to arouse an interest in the stock-owing public concerning the gravity of our lawless condition with respect to contagious diseases of animals, not only endangering the lives of our present valuable stock, but placing a powerful barrier and hindrance in the way to success in the lucrative industry of first-class stock-raising, for which a large section of our State is so pre eminently adapted. We feel again constrained to sound the call to arms against such a fell animal scourge as glanders, and we trust that when the opportunity arrives, the State Legislature, strengthened by the wishes of the public, for it is undoubtedly a matter of public interest—will see fit to place an embargo upon such a dangerous and inter-communicable disease, whereby the chances of its importation will be reduced to a minimum.

CEREBRITIS IN HORSES.

On January 25 we received a dispatch to proceed at once to Mansfield, De Soto parish, for the purpose of investigating a sickness prevailing amongst the horses in various sections of the parish. We found the disease to be "cerebritis"—known popularly as Blind Staggers—in an enzootic form. We suspected the presence of a fungus on the grain, and after careful investigation and enquiry it was ascertained that all the parties who had lost stock were feeding corn in a mouldy condition. In substantiation of the mouldy corn theory it was found, that no animals died where corn was not fed; nor were there any ill effects where corn was fed in a perfectly sound condition, and also that there was no further trouble, even where it had existed, when the bad corn was withheld and good corn substituted. It appears that in those sections of the parish where the disease existed with such fatal results, rains had been prevalent while the corn was in an undeveloped stage (milk stage), also that the green corn worm (Heliothis Armigera), was very destructive; so that with the ravages of the worm and the upright position of the young ears, aiding retention of the moisture, the fungus had presented to it the most favorable conditions for its attack and growth. On the other hand, where the precaution was taken to bend the corn stalks to allow the ears to droop and drain, there was no mould and no consequent sickness, and again, where the rains came after the ears were fully developed, neither mould nor fatalities occurred.

For further proof and experiment we brought several samples of the corn home to Baton Rouge, and with the assistance of Prof. Ross, who undertook the culture experiments, and Col. A. T. Prescott, Mycologist and Botanist, the microscopic work, we succeeded in producing and recognizing in all of the samples, the mould "Aspergillus glaucus," and in some of them the "Mucor mucedo" as well.

The following is a short account of culture experiments, by Prof. Ross:

"The culture media employed in the experiments were simple decoctions of bran and corn meal, the former being used in a larger number of culture tests. The dry bran or meal was first heated for one hour and a half at 150° C. in a sterilizing chamber, and was immediately thereafter transferred to a flask containing pure, freshly boiled water, the contents of the flask being at once brought to a boil and kept in a state of ebullition for one hour. A plug of sterilized cotton was then inserted in the mouth of the vessel, and it was allowed to stand for 24 hours, when the contents were again subjected to a boiling of an hour's duration. After cooling, the culture media were inoculated with spores from both the corn and cob, the cultures obtained from each source, however, being kept separate. The flasks were kept in a warm place during the progress of the experiments and were in every instance protected from introduction of foreign spores by means of sterilized cotton inserted in the mouth of the vessel. In several cases, second cultures were made by inoculating culture media, prepared as above described, with spores from the original cultures. In the case of the *mucor mucedo*, however, a very fine culture was obtained by a direct inoculation with spores obtained from the corn cob itself."

To make the work as complete as possible we intend making inoculation experiments with some of the smaller animals, but as this can not be finished in time for the present report, we shall defer it until a future publication.

Respectfully submitted,

W. H. DALRYMPLE, M. R. C. V. S.,
Veterinarian.

REPORT OF THE ENTOMOLOGIST.

Dr. W. C Stubbs, Director:

Dear Sir—The following embraces a review of the year's work, the detail of some of the work being published in bulletin form:

The need of this department in Louisiana is rapidly becoming apparent, for nearly every day either specimens are sent for identification and if destructive, remedies are asked for, or letters come inquiring for remedies for some of the already well known destructive insects of the State.

Louisiana is annually sustaining losses, up in the *millions*, from destructive insects, much of which might be saved by becoming familiar with the habits of insects, both of our friends and enemies, as well as the best methods of overcoming them, whether it be by rotation of crops, different systems of cultivation, or by the direct application of something which will result in their immediate death.

During the year this department has been equipped with those facilities necessary for the careful determination of the life-histories of these pests and for the study of those points connected with them, which are destined to suggest more ready means for their extermination. Already many life-histories of the more important pests have been determined.

CORN ROOT WORM (*Diabrotica* 12 *punctata.*)

Early during the year many planters complained of the difficulty of getting a stand of corn, due to destruction of the very young plant by the "corn root worm," which is the larval condition of a small beetle known commonly as the "Betsy" bug and scientifically termed Diabrotica, 12 punctata. This insect was very troublesome in many parts of the State, not only on

corn, but upon the seeds and plants of cucurbits (melons, cucumbers, etc.) The attack is made upon the very early growth of the plant, eating the first leaves and boring up through the young stock. The wilted condition of corn a few inches high indicates the presence of this pest. The eggs are evidently deposited upon the growing plant of corn before it reaches the surface, as plants grown in pots protected from insects until six inches high, and then burying the pots containing the plants in a corn field badly infested, they remain unmolested. The same may be said of melons, as plants grown upon sods protected from attack, until they begin to run and then planted in infested plots, these too, remain *unmolested.* The eggs have been found deposited upon the seeds and also just inside the bursting seeds of melons, thus accounting for the non-appearance of many plants above the ground in the case of cucurbits, as the young larvæ destroy the cotyledons within the seed.

The life-history of this pest was sought after and from one cage was determined as follows. Eggs deposited on April 14 hatched April 16 and 17; only four eggs were deposited by the one female at this time. The larval condition was ended on April 27 and 30 and the adults emerged on May 13. Nearly a month is consumed in the development of this insect. The greatest damage was done to both corn and melons between the 1st of March and the 1st of May. After the latter date little damage was done to corn.

Remedies.—1. Protect melons by gauze-covered bottomless boxes, 3 to 4 inches high and of sufficient length and width to cover ordinary melon hill.

2. Grow melons until about to run, in a protected frame, and then transplant.

3. Soak seeds of corn and melons in Kerosene Emulsion (undiluted) for twenty-four hours. This hastens germination and wards off attack.

4. The stirring of the ground, more particularly in the case of corn, is likely to remove the soft-bodied grub from the

plant, to which it is unable to return. If this is done soon after the corn appears above the ground much relief will be given.

A series of experiments were undertaken for the purpose of determining the most efficacious solution in which to soak the seeds before planting, the following substances being tried: Pure Kerosene Kerosene Emulsion, both undiluted and diluted; Copper Sulphate (1 ounce to 2 gallons of water); Kainite (1 ounce to 1 quart of water).

The Kerosene and Kerosene Emulsion (dilute and undilute) gave the best results, both regarding germination and in keeping away the insect. A perfect stand of corn being gotten in all cases.

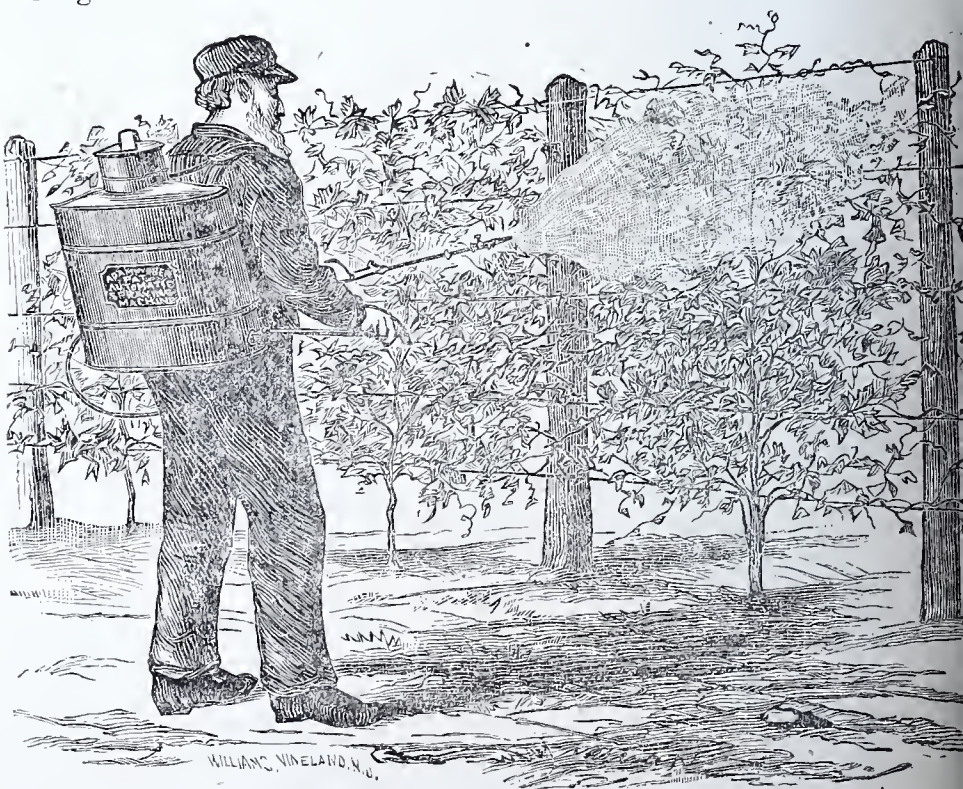
HORN-FLY (*Hæmatobia serrata*).

About the middle of Mareh many inquiries were received, and often specimens sent, relative to a small fly which had appeared upon the cattle and was giving great annoyanee. This proved to be the noted "horn-fly" which had gotten as far as the State of Mississippi the year before. An aceount of this insect with figures was published in a crop report and the methods of fighting this pest were there given. At that time we had not the opportunity of investigating methods of relieving the stock, but later adopted a series of tests in connection with different solutions. The stoek upon the Experiment Station were used for the development of these tests.

The following were the solutions used, putting them upon the stoek with a Knapsack Sprayer:

1. A 5 per cent. solution of Eueulyptus oil.
2. A 1 per cent. solution of Chryst-Jeyes' Fluid.
3. Ordinary Kerosene Emulsion.
4. An emulsion made similar to the Kerosene Emulsion, but substituting eommon black machine oil for the Kerosene oil.
5. An emulsion made same as No. 3, but substituting *Fish oil* for the Kerosene oil, in same quantity.
6. An emulsion made of Sludgite, 1 pound to 10 gallons of water. This Sludgite is a very strong smelling substance and it was expeeted would keep away the flies.

The stock were not sprayed a second time until the efficacy of the first spraying was determined. It was soon found that none of the solutions were of much value, except Kerosene and Fish Oil Emulsions and after a third trial all were discarded, except these. At this time the Fish Oil Emulsion had shown superiority over the Kerosene and further trial soon showed that animals after four or five days from time of spraying with Fish Oil Emulsion were free from attack of flies, while those upon which the Kerosene Emulsion had been used were being more or less annoyed, although not so much as those upon which nothing was sprayed. After a summer's trial of the Fish Oil Emulsion we recommend this much more readily for the relief of stock from the "horn-fly" than the Kerosene Emulsion. It is more easily kept in suitable solution and retains its odor much longer.



No. 1.

In order to apply this, stock should be enclosed and by the use of the Knapsack Sprayer (See Fig. 1), over 100 head may be treated in an hour.

We had equally as good results with a weaker emulsion of fish oil, made as follows: Dissolve one-half pound of common hard soap in 1 gallon boiling water, and while still hot add 2 gallons of fish oil, which is thoroughly mixed with the water by churning the whole solution together for four or five minutes. It may be thoroughly mixed by forcing the liquid through a large syringe or force pump for the same length of time. After being thoroughly agitated so as to have appearance of milk, dilute, using 15 to 20 parts of water to every 1 part of the solution.

SOUTHERN GRASS WORM (*Laphygma frugiperda*)

After the water due to overflow had left the lands along the Black and Ouachita rivers and vegetation made its appearance again after a second planting, many corn and peavine crops were destroyed by immense numbers of caterpillars, commonly known as the *Southern Grass Worm*. I was asked to make an investigation of this invasion and in doing so found myriads of these insects present in pasture fields and on corn and peavines. The corn was being very rapidly destroyed, the leaves were at the time of my visit "*ribboned.*" The breeding of these pests was begun and eventually the adults were bred and determined.

MEANS OF OVERCOMING THESE PESTS.

1. As these caterpillars feed in the cool of the morning and evening they may be found upon the outer leaves of the corn, and with a stick and a wide mouthed vessel great quantities can be hand-picked. Two or three pickings will relieve a field almost entirely and will be the means of saving the crop.

2. A much more efficient way would be to dust the plants with Paris green and slaked lime, using 1 part Paris Green to 50 parts lime for corn and 1 to 100 parts for tender plants like peas. The proper dilution may be easily determined before much of the field is gone over. I found a great many persons opposed to the use of Paris green, but there is no danger when properly

used, diluting it sufficiently so as not to injure the plant, and to exercise some care in handling it.

3. I found a large black grub feeding ravenously upon these caterpillars. This grub was recognized by most planters to be a friend and, as it should be, was being protected. The grub was the larval condition of a beetle known technically as *Calosoma calidum.*

SCALE INSECTS OF THE ORANGE.

During the space of time between the 15th of September and the end of December the scale insects affecting the orange were investigated, the results of which have been published in a special bulletin upon *The Orange.*

Among the sundry investigations of the year parasites were bred from the eggs of the Harlequin cabbage bug. Out of thousands of eggs confined to cages, but few harlequin bugs hatched. These parasites were not found in eggs of this insect any other place than around Homer, La. It is hoped that during the coming year they may become sufficiently disseminated that but few, if any, harlequin bugs may reach maturity, for it has long been one of the severest enemies to cruciferous plants.

Prof. Riley, of the Department of Agriculture, Washington, D. C., has kindly had this parasite named *Trissolcus Morgantiæ, Ashin.*

Respectfully submitted,

H. A. MORGAN,
Entomologist.

REPORT OF THE CHEMIST.

Dr. W. C. Stubbs, Director:

Dear Sir—I beg leave to submit, herewith, the following *resume* of work done in the Laboratory of the Station during the past year:

A large proportion of the work performed by the Chemical Department of the Experiment Station relates to the analysis of commercial fertilizers and a partial report as to analytical work of this character has already been made, and is included in the last Fertilizer Bulletin issued by the Stations. The amount of fertilizer work so far completed this season exceeds that performed during a corresponding period of the previous year, though there has been but little variation shown in the character of goods sent to the Laboratory for analysis.

In the analysis of a sample of natural phosphate recently forwarded for examination, my attention was directed to an accompanying circular setting forth the assumed advantages of the finely powdered non-acidulated phosphate rock over acid phosphates and dissolved bones. One of the chief claims advanced in favor of the phosphate rock and against the acid phosphate was that the free sulphuric acid in the latter was highly detrimental to vegetation and therefore constituted a valid objection to its use as plant food; as a matter of fact, however, the proportion of sulphuric acid used in the conversion of phosphate rock is only, in rare instances, sufficient to give an excess of full sulphuric acid in the product. As manufacturers frequently issue circulars of this character, claiming a higher value for insoluble or reverted phosphates than those containing their phosphoric acid in a soluble form, it would be well for farmers in purchasing their goods to consult the Fertilizer Bul-

letins, or to refer the matter direct to the Station, in order to avoid being deceived by such misleading statements.

There have also been analyzed by the Station complete fertilizers containing a considerable proportion of cotton seed hull ashes, with the result that a large loss of ammonia had been occasioned and a large proportion of the soluble phosphoric acid had reverted. Farmers and planters should, therefore, in the purchase of fertilizers, exercise caution with regard to the character of the materials used in compounding commercial manures.

Among the samples recently received by the Laboratory for analysis is a specimen of the waste or refuse from a moss ginning establishment, sent by Mr. G. W. Bancker, of St. Martinsville, La.

The analysis showed the following proportions of fertilizing constituents:

Phosphoric Acid	0.14 per cent.
Nitrogen	0.51 "
Equal to Ammonia	0.62 "
Potash	0.37 "

The proportion of phosphoric acid is too low to render this material a desirable source for that ingredient, though the nitrogen percentage is fair and the large proportion of organic matter which this substance would furnish to the soil, would make this of some value as a source of humus where soils may be deficient in this important ingredient.

In addition to the fertilizer work just referred to, quite a number of analyses of soils have been made during the past year, some of which were collected by the Geologist of the Stations, while others are samples of the different soils found on the Station at Baton Rouge and which latter are herewith given.

ANALYSES OF SOILS AND SUB-SOILS.

No. 1 a. Typical bluff soil.
No. 1 b. Sub-soil corresponding to the same.
No. 2 a. White soil.
No. 2 b. Sub-soil underlying white soil.

	1 a.	1 b.	2 a.	2 b.
Sand and Insoluble matter	90.650	89.79	87.72	83.00
Soluble Silica	.133	.043	.0784	.097
Phosphoric acid	.064	.128	.112	.106
Sulphuric acid	.036	.025	.031	.016
Ferric oxide } Alumina }	4.225	6.510	6.670	8.880
Lime	.170	.163	.060	.120
Magnesia	.114	.160	.021	.085
Potash	.100	.164	.120	.180
Soda	.078	.054	.076	.123
Organic and volatile matter	3.150	2.741	2.820	4.210
Moisture	1.540	.874	2.380	3.320

One of the features of these soils, as shown by their analyses, is the comparatively small proportion of lime contained, especially in the white soil.

In conjunction with the Veterinary Department, there have been made several examinations of waters and feeding stuffs, with a view to determining the probable causes of sickness among farm animals in different localities of the State. As the results of some of these investigations have already been given by the Veterinarian, it is not deemed necessary to give a detailed statement with regard to them in this report.

Quite recently a series of cultures of various mould growths have been made in this Laboratory, in order to determine the character of those vegetable organisms, whose presence in unsound corn caused some quite serious losses of stock in some localities in Northwest Louisiana.

It is expected that, in future, more time and attention will be devoted to investigations of this character, and that some systematic bacteriological work will be conducted in this Laboratory, with the co-operation of the Veterinarian.

Among the analyses lately made is that of a vegetable pear, grown on the Horticulturable grounds by Mr. F. H. Burnette, results of which are as follows :

Water	94.08 per cent.
Ash	0.35 "
Fat	0.47 "
Albuminoids	0.28 "
Fibre	0.75 "
Carbohydrates	4.07 "

It will be observed that the most remarkable feature of this analysis is the extremely high proportion of water contained, and the relatively small amounts of nutritive constituents present. When the results, however, are calculated to the basis of dry substance, a somewhat better idea is obtained of the nutrient value of this substance, which exhibits a rather low proportion of albuminoids and a high percentage of carbohydrates.

In the latter part of the past season a number of samples of foreign varieties of cane grown on the Experiment Station were analyzed in this Laboratory, and the results are given below. The samples had been kept in the windrow for several days before being sent to the Laboratory, and some of the varieties, upon examination, showed marked signs of deterioration, as the results of analysis of several of the samples indicate. On the other hand, some of the best of the foreign varieties exhibited an increased sucrose percentage over that of some of the previous seasons, thus showing a tendency towards acclimatization on continued cultivation.

ANALYSES OF CANE.

Variety.	Total Solids.	Sucrose.	Glucose.	Solids Not Sugar.	Coefficient of Purity.	Glucose Ratio.
Ainakea	11.9	4.5	5.48	1.92	37.81	121.77
Pupuha	18.1	15.2	1.76	1.14	83.98	11.58
Honuala	14.2	6.6	5.10	2.50	46.48	77.27
Rose Bamboo	17.3	11.9	3.40	2.00	68.78	28 57
Ohia	14.1	6.3	5.37	2.43	44.68	85.24
Portier	15.0	12.3	1.70	1.00	82.00	13.82
Kanio	13.1	5.1	5.54	2.46	38.93	108.62
Uwala	16.8	13.2	2.69	0.91	78.57	20.38
Yellow	15.6	8.6	4.90	2.10	55.13	56.98
Green	14.1	7.9	5.40	0.80	56.03	68.35
Kokea	16.7	12.1	2.85	1.75	72.45	23.55
Papua	13.8	5.6	6.37	1.83	40.58	113.75
Akiola	14.9	8.9	4.75	1.25	59.74	53.37
Crystallina	18.0	13.7	2.83	1.47	76.11	20.66

In addition to the above analyses of cane, several samples of upland cane grown by Mr. John McQuaid, were analyzed during the recent season. The results were as follows:

Description of Cane.	Total Solids.	Sucrose.	Glucose.
Plant cane	15.2	12.1	2.56
First year's stubble	18.7	16.4	1.25
Second year's stubble	18.8	15.8	1.64
Third year's stubble	19.0	16.3	1.39

These figures but further tend to corroborate those previously secured in this Laboratory, and demonstrate the high excellence of the cane grown on the bluff lands adjacent to Baton Rouge. The superiority of this cane as regards its sucrose content is more evident when it is considered that these samples were analyzed about October 15, when the grinding season was just beginning. A sample of cane from the same place, a few weeks later, showed a sucrose proportion of about 18 per cent.

Supplementary to the analytical work immediately connected with the Station, a large amount of time and labor has been devoted to the investigation of methods of sugar analysis, these results being published in full in the report on sugar analysis in the "Proceedings of the Association of Official Agricultural Chemists" and a portion of this work has also appeared in the "Louisiana Planter."

Among the chief points investigated were: The presence of reducing bodies other than glucose in molasses and their effect upon results of glucose determinations by ordinary methods; the determination of water in sugar products, both by drying in air and in vacuo; the determination of ash in sugar products by various methods; the polariscopic readings of invert sugar solutions under different conditions, both as regards temperature and manner of inversion.

A study was also made of gravimetric methods for invert sugar determinations, with a view of finding a process which would be easy of accomplishment and which would, at the same time, afford reliable results.

The ease and accuracy of execution of the electrolytic process for the estimation of copper quite readily suggested the propriety of the adaptation of this method to invert sugar determinations, several processes having been recommended for the application of electrolysis to work of this description by different authors.

Some years since Formanek (Ztschr. Zucker Ind. in Boh., 1890, 178; Chem. Ztg. Rep. 1890, No. 41) advocated the electrolytic separation of the copper from a nitric acid solution, the process being conducted as follows:

"The precipitated suboxide, having been previously brought upon a Swedish filter paper and washed thoroughly, is dissolved on the filter with 20 c. c. of nitric acid of 1.20 sp. gr., the filter being well washed immediately thereafter. The acid solution and washings, amounting in bulk to from 150 to 180 c. c., are transferred to a platinum dish and the electrolysis of the solution is effected in the usual manner, a current yielding 3–4 c. c. of oxy-hydrogen gas per minute being recommended for the work."

In the utilization of the process, as thus described, it has been found that the time and labor incident to dissolving the precipitates and thoroughly washing the filters constitute a not inconsiderable item where much work of this class is to be done, and the subsequent transfer of the liquid to another vessel still further adds to the work of manipulation.

In making numerous tests of the adaptability of the electrolytic method to invert sugar determinations during the past year, it was found that the following modification of Formanek's method gave most satisfactory results :

The precipitation of the cuprous oxide is effected in a beaker and the precipitate is at once brought upon an asbestos filter in an ordinary funnel and the washing with hot water is performed in the usual manner. It will not be found necessary to completely transfer the precipitate to the filter, and when the washing is concluded, the filter and contents are placed in the original beaker and the funnel rinsed with a nitric acid solution containing 4 c. c. of acid of 1.42 sp. gr. per 100 c. c. of solution.

The dilute acid is added to the contents of the beaker until a bulk of about 200 c. c. is secured, and after the platinum electrodes are placed in the liquid, connection is made with a battery giving a current equivalent to .5 to .7 c. c. of electrolytic gas per minute.

The anode employed is a flat spiral of platinum wire of the form devised by Luckow, and is allowed to rest on the bottom of the beaker, while a platinum cylinder of the usual form, suspended vertically, receives the deposit of copper.

No attempt is made to dissolve the cuprous oxide, either on the filter or in the beaker, before the circuit is closed, it being found that the solution of the precipitate and the deposition of the copper proceeded simultaneously and continuously after the flow of current had commenced.

In order to test the accuracy of the results obtainable by this process a solution of copper sulphate and also of alkali-tartrate were prepared according to Soxhlet's formula, the two liquids being preserved without mixing.

The accurately weighed equivalent of 10 c. c. of the copper sulphate solution was largely diluted with water, slightly acidified with nitric acid and electrolysis of the liquid was accomplished in the usual manner.

Four separate determinations gave the following amounts of copper per 10 c. c. of solution:

Experiment No. 1	.1732	grams.
" No. 2	.1735	"
" No. 3	.1742	"
" No. 4	.1740	"
Average	.1737	"

A weighed quantity of same solution corresponding to 10 c. c. was next placed in a beaker, an equal volume of alkali-tartrate solution added, and the liquid, after dilution with water, brought to a brisk boil. A quantity of a pure dextrose solution, more than sufficient to completely precipitate the copper, was next added and the boiling continued for two minutes. The precipitated suboxide, after a thorough washing upon the filter, was returned, along with the asbestos filter, to the beaker, about 200 c. c. of dilute nitric acid solution added and the electrolytic separation of the copper conducted as before described.

The results of six determinations executed in this manner indicated the following quantities of copper per 10 c. c. of solution:

Experiment No. 1	.1730	grams.
" No. 2	.1731	"
" No. 3	.1736	"
" No. 4	.1730	"
" No. 5	.1737	"
" No. 6	.1740	"
Average	.1734	"

These figures attest the accuracy of the results to be secured by this method when it is properly executed, and numerous other practical tests with sugar products of various kinds further tend to confirm the conclusions drawn from these experiments. A complete deposition of the copper can be readily secured in eight hours, and it was observed that the copper films obtained by this process were remarkably bright and entirely free from sponginess.

The extremely small amount of manipulation connected with the method causes little time to be consumed in its execution, and it is frequently found advantageous to allow the electrolytic separation of the copper to take place over night.

In addition to the use of the asbestos filter in an ordinary funnel, the Gooch crucible has been employed for some filtrations, the crucible, after completion of the washing, being suspended in a beaker containing dilute nitric acid, and connected with the positive pole of the battery.

It was found, however, that the time consumed by the process was much lengthened by the use of this last modification.

Where the cuprous oxide has been brought upon a Swedish filter-paper instead of asbestos, the filter and contents can be placed in the beaker and after addition of dilute nitric acid, the electrolysis can be effected as before described.

It is also possible to conduct the electrolytic process with the use of a nitric acid solution, even more dilute than the one to which reference has been made in the description of this method.

In addition to the employment of this process in the estimation of reducing sugars in different sugar products, it can also be readily applied to the determination of starch, where any of the leading cupric reducing methods are utilized, after treatment of the starch containing materials with dilute acid.

A method for the direct determination of Citrate-Soluble Phosphoric Acid has lately been devised in this Laboratory and a large number of practical tests upon different materials under varying conditions have resulted most satisfactorily.

The length of time and amount of manipulation frequently required in the filtration and washing of the citrate insoluble residue, its ignition and solution, makes it quite desirable to employ, if possible, a quick process for the direct determination of the reverted phosphoric acid.

The method above referred to is executed as follows :

After completion of the 30 minutes' digestion of the sample with citrate solution, filter out at once into a dry vessel 25 c. c.

of the solution; if the liquid is filtered directly into a dry burette, 25 c. c. can be readily transferred to another vessel without dilution. After cooling, run 25 c. c. of the solution into a digestion flask of 250–300 c. c. capacity, add about 15 c. c. of concentrated sulphuric acid and place the flask on a piece of gauze over a moderately brisk flame; in about eight minutes, the contents of the flask commence to darken and foaming begins, but will occasion no trouble, if an extremely high, or a very low flame are avoided. In about 11–12 minutes, the foaming ceases and the liquid in the flask appears quite black; about one gram of mercuric oxide is now added and the digestion is continued over a brisk flame. The operation can be completed in less than half an hour with ease, and in many cases, 25 minutes. After cooling, the contents of the flask are washed into a beaker, ammonia is added in slight excess, the solution is acidified with nitric acid and after the addition of 15 grams of Ammonium nitrate, the process is conducted as usual.

In case as large an aliquot as 50 c. c. of the original filtrate is used, 10 c. c. of sulphuric acid are added, and the digestion is conducted in a flask of 300–500 c. c. capacity; after the liquid has blackened and foaming has progressed to a considerable extent, the flask is removed from the flame, 15 c. c. more of sulphuric acid are added and the flask and contents are heated at a moderate temperature for two or three minutes; the mercuric oxide is then added and the operation completed as before described.

Comparative tests of this process and the regular method are being made on all samples of fertilizers analyzed, and it is designed to continue the investigation.

In conclusion, I would say that a large proportion of the work in connection with the analyses and investigations above referred to, has been performed by Mr. R. E Blouin, the Assistant Chemist of the Station.

Very respectfully,

B. B. ROSS.